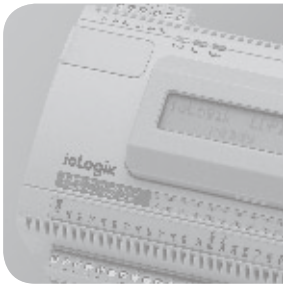
Remote I/O Servers

9

Remote I/O Servers



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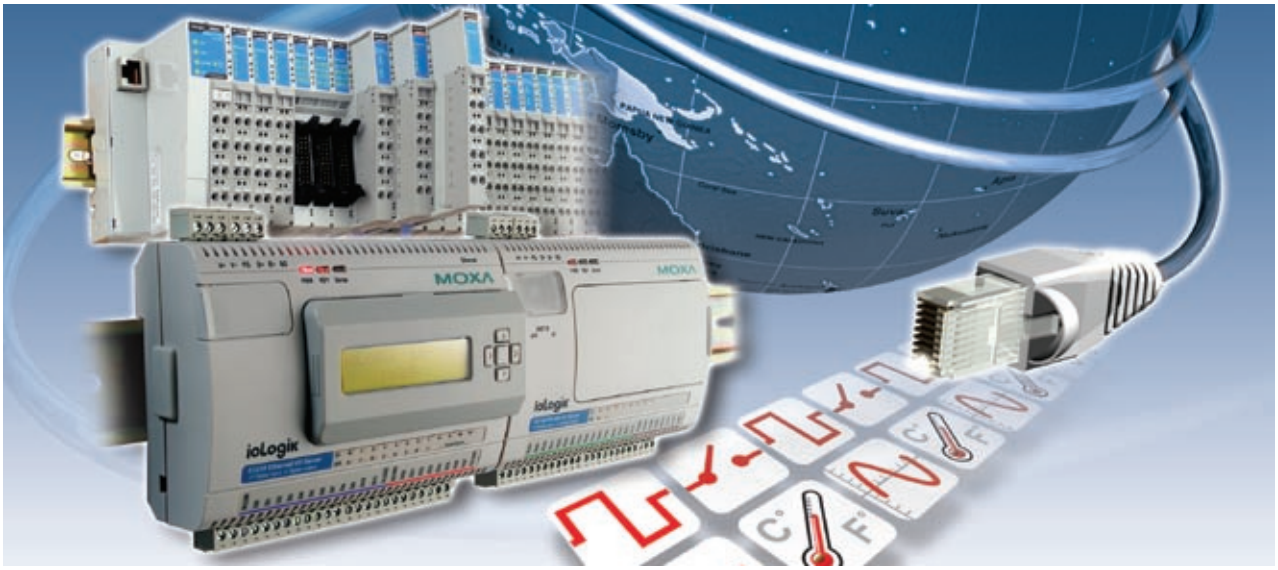
User-Friendly Industrial-Quality I/O

Simplifies Industrial IT Integration



Flexible Remote I/O Solutions for PC-Based Data Acquisition and Control Applications

As Ethernet achieves mainstream usage in PC-based data acquisition and control systems, an I/O solution is needed that unleashes the power of Ethernet and Internet technology. MOXA offers a complete range of remote I/O solutions.

ioLogik E2000, R2000 and 4000 Series

Active Ethernet I/O, New Generation I/O that Talks over Ethernet

ioLogik E2000 Active Ethernet I/O Server

- Pro-active, real-time transmission of I/O data over TCP/IP networks
- Intuitive Click&Go logic for I/O messaging and local output control
- Support for both Modbus/TCP and SNMP I/O protocols

Serial Remote I/O

ioLogik R2000 Serial Remote I/O Server

- General DIO and AIO signals over RS-485 networks
- Support for standard Modbus/RTU protocol up to 115200 bps

Expandable Remote I/O

ioLogik 4000 Expandable I/O Server

- Support for Ethernet, RS-485, and RS-232 interfaces
- Large scale architecture with support for more than 35 types of I/O modules
- Support for standard Modbus/TCP, Modbus/RTU/ASCII protocols

ioMirror E3000 Series

Ethernet Peer-to-Peer I/O

- Duplication of remote input signals over IP network
- Uses existing Ethernet infrastructure
- Requires no programming, no PLC or PC controller

Industrial-Quality Remote I/O

Unlike project-based and commercial-grade I/O products, ioLogik remote I/O solutions are equipped with PLC-quality hardware logic control and with the best features of Ethernet and TCP/IP.

Multi-functional I/O

All I/O channels in the ioLogik 2000 line of remote I/O servers are multi-functional to better handle field applications. For example, the digital input of the ioLogik E2210 can also function as an event counter, and the digital output can generate programmable pulse output signals.

Over current/temperature protection

The digital output channels on most ioLogik servers include over-current/temperature protection. Power to the channel is automatically shut down when the current or temperature exceeds the operational limits.

Safe status with communication watchdog timer

In SCADA systems, ioLogik servers can use safe status to configure an analog or digitial output channel's response to a break in network communication.

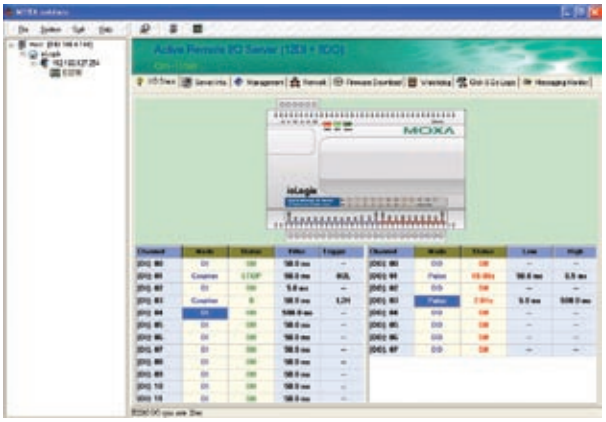
Module to module isolation

All I/O modules are isolated in order to confine damage to the module itself.

Easy-to-Use Utility with On-Line Documentation

All ioLogik remote I/O servers may be managed over the network with a single utility called ioAdmin. The graphical interface instantly displays the status and settings of all channels.

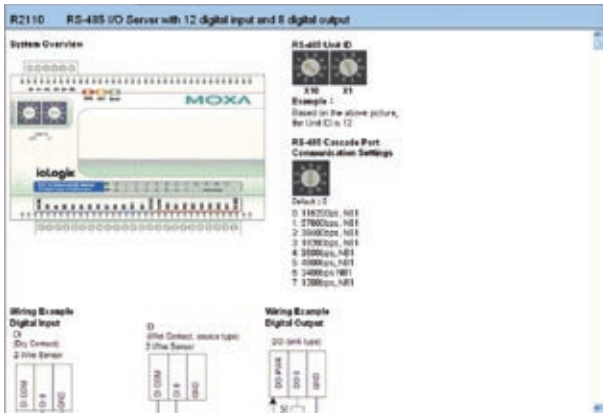
Intuitive interface



ioAdmin is a Windows utility with an intuitive interface that features

- Automatic search of ioLogik servers on the network
- On-line monitoring tool
- On-line I/O testing tool

Time-saving on-line wiring guide



ioAdmin's on-line wiring guide can save time when planning or troubleshooting field wiring.

Configuration file

Each ioLogik remote I/O server may export its entire configuration as a text file which can be used in several ways:

- As a record or backup of the configuration
- As a quick reference quide for configuration of Modbus drivers in a SCADA system

MXIO DLL Library for quick programming

When you need to develop your own data acquisition and control system software, Moxa's MXIODLL library supports Visual Basic, Visual C++ and Borland C++ under Windows for quick programming.

Support for SCADA/OPC-Compliant Modbus Protocol

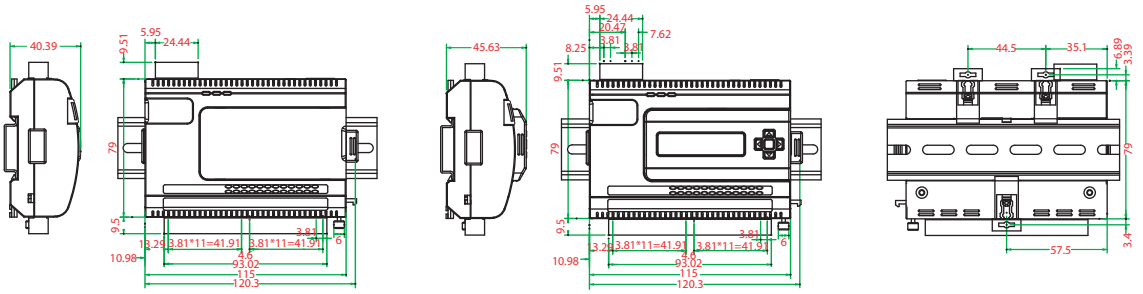
ioLogik remote I/O servers support the most popular standards – Modbus/TCP and Modbus/RTU. Most standard Modbus drivers for SCADA software and OPC Server are compatible with ioLogik servers. Currently, Citect, Wonderware Intouch, iFix, and Kepware OPC Server have been tested. For more information, please refer to www.moxa.com.

Operates Seamlessly with PCs and Embedded Computers

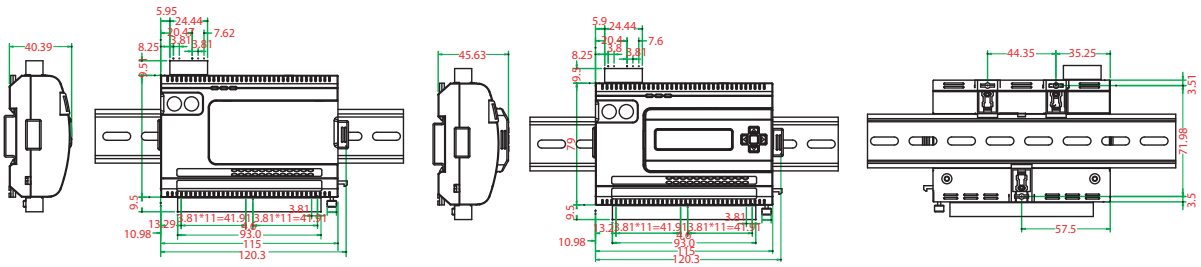
With Active Ethernet I/O, the ioAdmin utility, and MXIO DLL library tools, ioLogik remote I/O servers are designed for seamless operation within a PC-based environment.

Dimensions (unit=mm)

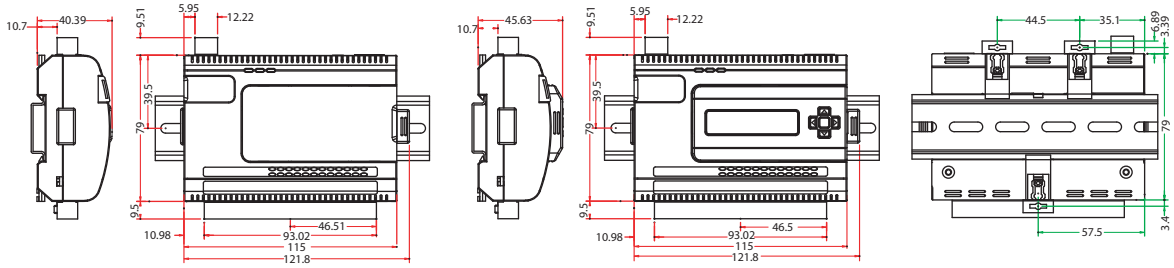
ioLogik E2000



ioLogik R2000



ioMirror E3000



Unit: mm

Remote I/O Servers Selection Guide

ioLogik E2000 Series Active Ethernet I/O Servers

Digital Input/Output

Model		E2212	E2210
Input	Channels	8	12
	Modes	DI or Event Counter (Event Counter up to 900Hz, configurable filtering time)	DI or Event Counter (Event Counter up to 900Hz, configurable filtering time)
	Dry Contact	Yes	Yes
	Wet Contact	Source type, 24 VDC PNP/NPN sensor selectable	Source Type, 24 VDC
	Isolation	3K VDC	3K VDC
Output	Channels	8	8
	Modes	DO or Pulse Output (Pulse Output up to 1 KHz, hi/lo width configurable)	DO or Pulse Output (Pulse Output up to 1 KHz, hi/lo width configurable)
	Current	200 mA/channel	200 mA/channel
	Protection	Over current limit, over temperature shutdown	Over current limit, over temperature shutdown
Configurable DI/DO, Channel		4	-
Comm.	Interface	10/100 Mbps Ethernet	
	Protocols	Modbus/TCP, Bootp, DHCP, SNMP, HTTP, SNTP	
	Security	IP Filtering	
	LCD display	Optional	
Click&Go Logic		Yes	

Analog Input/Output

Model		E2240
Input	Channels	8
	Resolution	16 bit
	Modes	±150 mV, ±500 mV, ±5V,± 10 V, 0 to 20 mA, 4 to 20 mA
	Sampling Rate (All Channels)	Voltage: 10 samples/sec Current: 6 samples/sec
	Isolation	3K VDC
Output	Channels	2
	Resolution	12 bit
	Modes	0 to 10 V, 4 to 20 mA
Accuracy		+/- 0.1%FSR @ 25°C, +/- 0.3%FSR @ -10, 60°C
Comm.	Interface	10/100 Mbps Ethernet
	Protocols	Modbus/TCP, Bootp, DHCP, SNMP, HTTP, SNTP
	Security	IP Filtering
	LCD display	Optional
Click&Go Logic		Yes

ioLogik R2000 RS-485 Remote I/O Servers

Digital Input/Output

Model		R2110
Input	Channels	12
	Modes	DI or Event Counter (Event Counter up to 50 Hz, configurable filtering time)
	Dry Contact	Yes
	Wet Contact	Source Type, 24 VDC
	Isolation	3K VDC
Output	Channels	8
	Modes	DO or Pulse Output (Pulse Output up to 50 Hz, hi/lo width configurable)
	Current	200 mA/channel
	Protection	Over current limit, over temperature shutdown
Comm.	Interface	RS-485 (2-wire) 1200 to 115200 Kbps
	Protocols	Modbus/RTU
	LCD display	Optional

Analog Input/Output

Model		R2140
Input	Channels	8
	Resolution	16 bit
	Modes	±150 mV, ±500 mV, ±5 V, ±10 V, 0 to 20 mA, 4 to 20 mA
	Sampling Rate (All Channels)	Voltage: 10 samples/sec Current: 6 samples/sec
	Isolation	3K VDC
Output	Channels	2
	Resolution	12 bit
	Modes	0 to 10 V, 4 to 20 mA
Accuracy		+/- 0.1%FSR @ 25°C, +/- 0.3%FSR @ -10, 60°C
Comm.	Interface	RS- 485 (2-wire) 9600 to 115200 Kbps
	Protocols	Modbus/RTU
	LCD display	Optional

ioMirror E3210 Peer-to-Peer I/O Server

Digital Input/Output

Model		E3210
Input	Channels	8
	Modes	Digital Input
	Dry Contact	Yes
	Wet Contact	Source Type, 24 VDC
	Isolation	3K VDC
Output	Channels	8
	Modes	Digital Output
	Current	200 mA/channel
	Protection	Over current limit, over temperature shutdown
Comm.	Interface	10/100 Mbps Ethernet
	Protocols	Modbus/TCP, Bootp, DHCP, SNMP, HTTP, SNTP
	Security	IPFiltering
	LCD display	Optional
ioMirror		Yes

ioLogik 4000 Expandable Remote I/O Servers

Network Adapters				
Module		NA-4010	NA-4020	NA-4021
Specs	Interface	Ethernet	RS-485	RS-232
	Protocols	Modbus/TCP, HTTP, Bootp	Modbus/RTU, Modbus/ASCII	Modbus/RTU, Modbus/ASCII
	Safety	UL 508		
	Watchdog	Yes		

Digital Inputs											
Module		M-1400	M-1401	M-1410	M-1411	M-1800	M-1801	M-1600	M-1601	M-1450	M-1451
Specs	Channels	4	4	4	4	8	8	16	16	4	4
	Sink/Source	Sink	Source	Sink	Source	Sink	Source	Sink	Source	–	–
	Connector	RTB						20-pin		RTB	
	Voltage	24 VDC	24 VDC	48 VDC	48 VDC	24 VDC	24 VDC	24 VDC	24 VDC	110 VAC	220 VAC
	Isolation	2 KV rms optical isolation									

Digital Outputs													
Module		M-2400	M-2401	M-2800	M-2801	M-2600	M-2601	M-2402	M-2403	M-2404	M-2405	M-2250	M-2254
Specs	Channels	4	4	8	8	16	16	4	4	4	4	2	2
	Sink/Source	Sink	Source	Sink	Source	Sink	Source	Sink	Source	Sink	Source	Relay	Triac
	Connector	RTB				20-pin		RTB					
	Voltage	24 VDC										230 VAC/ 24 VDC	12 to 125 VDC
	Current	0.5A	0.5A	0.5A	0.5A	0.3A	0.3A	0.5A	0.5A	2.0A	2.0A	2.0A	0.5A
	Isolation	2 KV rms optical isolation											
	Diagnostics	–	–	–	–	–	–	Yes	Yes	Yes	Yes	–	–

Analog Inputs													
Module		M-3400	M3402	M-3410	M-3412	M-3414	M-3401	M-3403	M-3411	M-3413	M-3415	M-6200	M-6201
Specs	Channels	4	4	4	4	4	4	4	4	4	4	2	2
	Current	0 to 20 mA	4 to 20 mA	–	–	–	0 to 20 mA	4 to 20 mA	–	–	–	–	–
	Voltage	–	–	0 to 10V	-10 to 10V	0 to 5V	–	–	0 to 10V	-10 to 10V	0 to 5V	–	–
	Connector	RTB											
	Resolution	12-bit	12-bit	12-bit	12-bit	12-bit	14-bit	14-bit	14-bit	14-bit	14-bit	–	–
	Isolation	1K VDC galvanic isolation											
	Sensor Input	–	–	–	–	–	–	–	–	–	–	RTD PT100 JPT100 (Ohm)	Thermo-couple (μV)

Analog Outputs						
Module		M-4201	M-4202	M-4210	M-4211	M-4212
Specs	Channels	2	2	2	2	2
	Current	0 to 20 mA	4 to 20 mA	–	–	–
	Voltage	–	–	0 to 10V	-10 to 10V	0 to 5V
	Resolution	12-bit	12-bit	12-bit	12-bit	12-bit
	Connector	RTB				
	Isolation	1K VDC galvanic isolation				

Facility Management

Airport Security System with Active Ethernet I/O

Airport security systems have faced many new challenges over the past few years. The threat of terrorism has caused many countries to introduce major security changes and upgrades to their airports. It is vital for travelers to feel safe and comfortable when using air transportation. Today's airport administration systems must be effective, modern, and safe. Video surveillance systems help ensure good security and generate valuable records. However, the large volume of space that requires real-time monitoring is a significant challenge. Every gate, terminal, and exit needs to be taken into account. For an effective real-time monitoring system with easy control, today's airport security systems use sensors with Active Ethernet I/O.

Architecture Requirements

- Sensor-triggered reporting and control
- Send I/O status with timestamp
- High speed Ethernet communication
- Simple local control capability
- High-performance video surveillance

Why Moxa?

- Active I/O messages that report status without polling
- Click&Go for smart and simple local control
- Built-in 10/100Mbps Ethernet
- VPort video server for 30 frames/sec at 352 x 240

Key Products

ioLogik E2210

Active Ethernet I/O Server with 12 DI, 8 DO

VPort 3310

1-channel Industrial MPEG4 Video Server

Intelligent Transport System

More Efficient Automated Parking Using Active Ethernet I/O

The often tiresome search for a parking spot is a familiar dilemma for any resident or visitor of a modern city. Automated parking garages help improve the situation by letting drivers know the exact number of available spaces in real-time. However, after a driver enters the lot, a laborious and frustrating search may still be required to find one of those spaces.

One provider has come up with a simple but effective solution using MOXA's Active Ethernet I/O. For each section of the parking lot, an ioLogik E2210 server is installed with distance sensors for each parking space. Using the ioLogik server's Click&Go feature, a simple control logic is defined where an indicator lamp turns on automatically when a parking space is available. When all spaces in the area are occupied, the lamp turns off.

This solution is easy to implement and provides an ideal combination of simplicity and effectiveness. With the provider's system in place, drivers do not have to make slow, frustrating laps around the lot to find an empty space. Drivers can simply glance at the indicator lamps to find out immediately if there are any available spaces in an area.

Architecture Requirements

- Local control that is server-independent
- Sensor-triggered status reporting
- Ability to monitor multiple spaces
- I/O data transmission over Ethernet

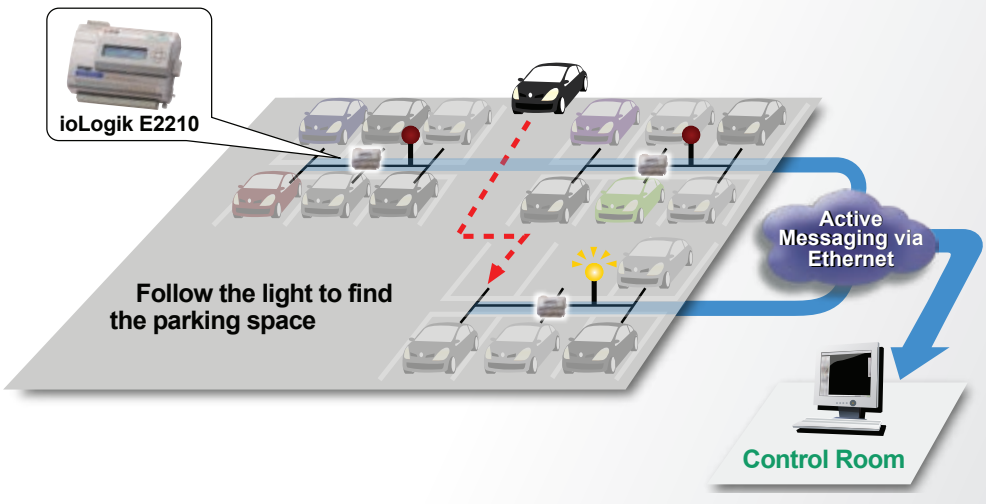
Why Moxa?

- Local control with Click&Go feature
- Active I/O messaging that transmits data without polling
- Built-in 10/100Mbps Ethernet

Key Products

ioLogik E2210
Active Ethernet I/O Server with 12 DI, 8 DO

EDS-205
5-port Industrial Ethernet Switch



Building Automation

Using Existing Ethernet to Transmit I/O Signals

Many fields already have significant Ethernet penetration, so most information can be made accessible over Ethernet without requiring further wiring. Furthermore, modern buildings are constructed with Ethernet built-in, so Ethernet access is available anywhere in the building. Many smart buildings now rely on Ethernet to transmit environmental data to a control center. However, integrating traditional data acquisition systems with Ethernet can be logistically challenging. MOXA provides the best solution for transmitting I/O signals over an existing Ethernet network, without requiring any change to the network architecture.

Architecture Requirements

- Direct input output communication over IP network
- Little or no modification of existing architecture
- Utilize existing IP network

Why Moxa?

- Peer-to-Peer I/O
- Ethernet communication
- Direct input and output signal over IP network
- Supports DI/O and mA signal
- Supports standard Modbus protocol

Key Products

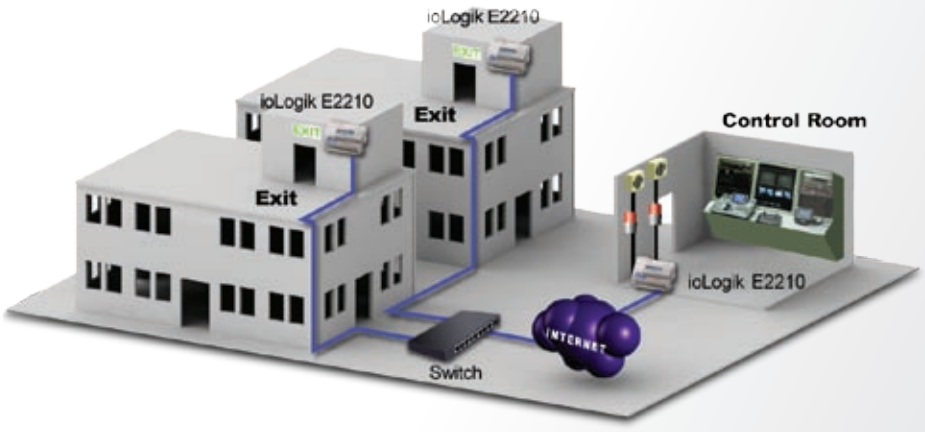
ioLogik E2210

Active Ethernet I/O Server with 12 DI, 8 DO

ioLogik E2240

Active Ethernet I/O Server with 8 AI, 2 AO

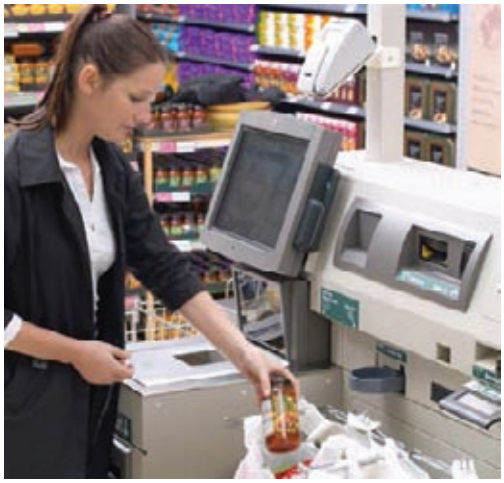
Building Automation



POS / Retail Automation

New Concept for CRM System

A decisive factor for success in retail is the ability to develop and retain customer loyalty. A new in-store interactive system has been developed by one European supermarket company to fuel customer interest with games and rewards. The interactive system requires access to real-time visitor tracking data and relies on a specially developed Visual Basic application for control and management. MOXA's ioLogik servers provide key support to the system with digital counter operation and access over Internet.



System Requirements

- Digital sensors in counter mode
- Counter value retained when power is off
- Local I/O control
- Internet transmission of counter value
- Low network bandwidth requirment

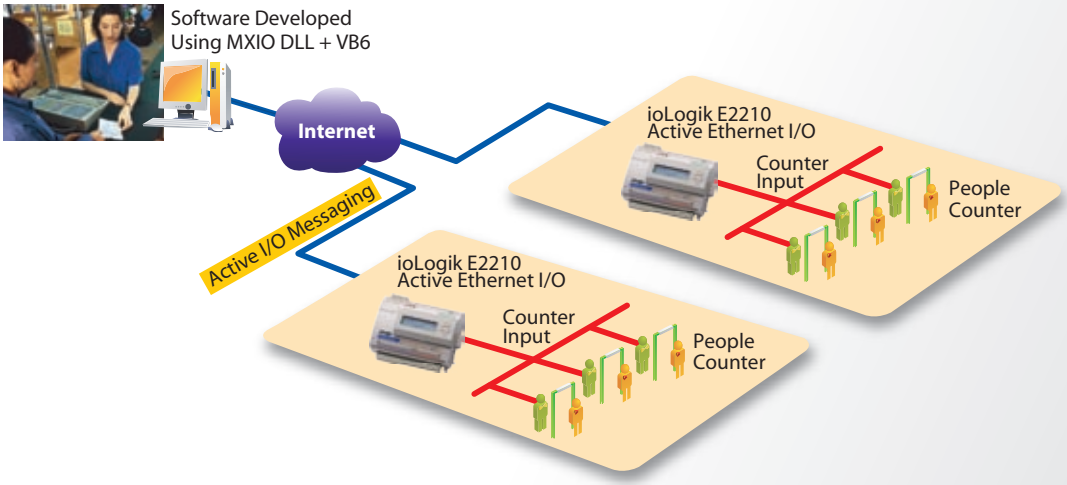
Why Moxa?

- Active I/O messages for data transmission without polling
- Click&Go feature for simple local control without local pc
- Built-in 10/100Mbps Ethernet
- Support Counter mode for DI input (900Hz)

Key Products

ioLogik E2210

Active Ethernet I/O Server with 12 DI, 8 DO



Warehouse Management

Truck Loading Station with Local Control

The basic support structure for commercial transport is provided by trucks and truck loading stations. With rising fuel costs and constant pressure to deliver greater quantities in a shorter amount of time, it is essential to maximize operational efficiency wherever possible. A prominent Asian cigarette company has developed an automated guidance system to streamline operations at their truck loading stations. The guidance system uses an optical sensor and warning light to indicate when a truck is in proper position for weighing. The sensor, warning light, and control room PC needed to be integrated, but using a traditional PLC would be difficult and expensive. PLCs require specialized ladder programs, which would raise programming and maintenance costs. In addition, a PLC solution for this system would require a separate and expensive Ethernet module, for which there is no easy way to communicate directly with PCs. The cigarette company found a much simpler and more effective control solution using MOXA's Active Ethernet I/O.

System Requirements

- Automated local switch control
- Sensor-triggered operation and data transmission
- Ethernet communication
- DLL library for Windows platforms

Why Moxa?

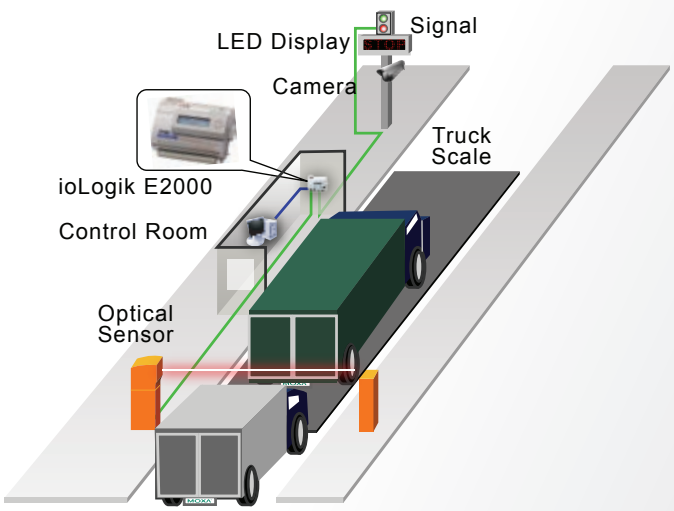
- Click&Go feature for local control
- Active I/O messages for data transmission without polling
- Built-in 10/100Mbps Ethernet
- Free Windows library for VB,VC++, and Borland C++ Builder

Key Products

ioLogik E2210
Active Ethernet I/O Server with 12 DI, 8 DO

EDS-205
5-port Industrial Ethernet Switch

Warehouse Management



Unmanned Site Management

New Vision for Roadside Cabinet Monitoring with Active Ethernet I/O

Many different industries rely on roadside cabinets to provide service to multiple households in a specific area. Different types of equipment may be installed in such cabinets, such as traffic devices or telecom servers. Roadside cabinets were primarily used to serve rural and remote areas, but are now common in urban areas as well. They can be found next to a highway or next to a sidewalk, almost anywhere a person may look.

The equipment in a roadside cabinet is typically monitored by remote I/O servers or PLCs. However, in order to allow monitoring over Ethernet, existing equipment must be upgraded by installing expensive and proprietary Ethernet modules. Custom software must also be developed to monitor all I/O channels over Ethernet, creating a significant challenge.

New approaches to roadside cabinet monitoring may be applied to transportation, power meters, and water meters.

System Requirements

- Local control that is independent of network connection
- Sensor-triggered data transmission without polling
- Easy mass deployment and firmware upgrade
- Ethernet connection
- DLL library for Windows platform

Why Moxa?

- Active I/O messages for data transmission without a local controller or PC
- Click&Go logic feature for local control
- Built-in 10/100 Mbps Ethernet
- Windows library for VB, VC++, and Borland C++ Builder

Key Products

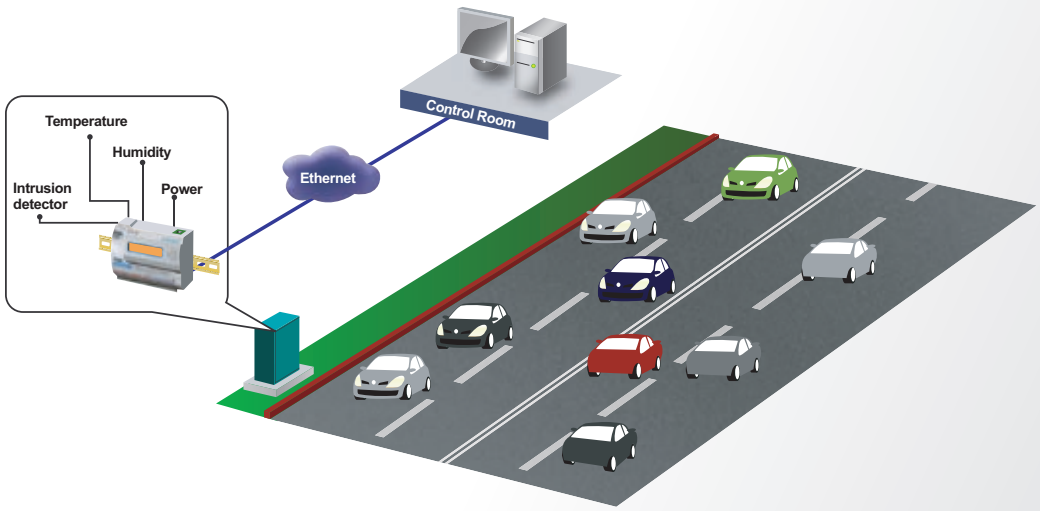
ioLogik E2210

Active Ethernet I/O Server with 12 DI, 8 DO

EDS-208

8-port Industrial Ethernet Switch

Unmanaged Site Management



Machine Room Management

Active Ethernet I/O for SNMP-based Remote Site Monitoring

Centralized server room management is mainly achieved using SNMP-based solutions, in fields such as the telecom industry, the military, universities, and many others. However, SCADA systems are the typical choice for monitoring environmental information such as device open/close status, temperature levels, and enclosure humidity levels. With MOXA's Active Ethernet I/O, not only can SNMP management be used to monitor remote server and router equipment, it can also be used to monitor remote I/O sensors. All information can thus be integrated into a single SNMP-based system, lowering workloads and improving performance.

System Requirements

- Sensor data transmitted using SNMP protocol
- Support for SNMP trap
- User-defined threshold for temperature and humidity
- Monitoring of humidity and temperature via Ethernet

Why Moxa?

- Click&Go for SNMP-based I/O reporting
- SNMP traps without polling effort
- User-defined reporting rules

Key Products

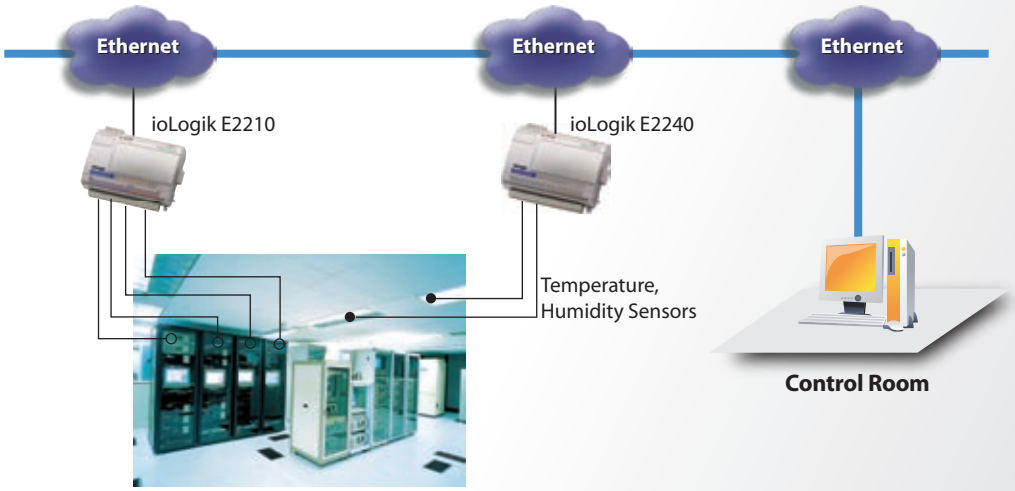
ioLogik E2210

Active Ethernet I/O Server with 12 DI, 8 DO

ioLogik E2240

Active Ethernet I/O Server with 8 AI, 2 AO

Machine Room Management



Machine Builder

Ethernet I/O Server Designed for Easy Implementation

Developing countries rely heavily on the building construction industry, and the availability of concrete can be a critical factor in a nation's development. To achieve more efficient concrete production, companies have increasingly relied on automated systems. An excellent solution involves using MOXA's I/O servers as part of a smart concrete production plant. MOXA's different product lines are specially designed for different systems.

The ioLogik 4000 series is designed for high density environments, whereas the ioLogik 2000 line is ideal for distributed environments. Whichever ioLogik server is used, the powerful DLL library provided by MOXA makes it easier for programmers to develop robust applications for their specific needs.

Architecture Requirements

- Flexible I/O combination
- Easier wiring for high density environments
- Free PC-based DLL library
- Ethernet communication
- Counter mode for digital input

Why Moxa?

- Easy-to-use VB, VC++, and BCB libraries for Windows/WinCE/Linux platforms
- 16-channel digital input and output module for easy wiring
- Expandable I/O design
- Counter mode for digital input

Key Products

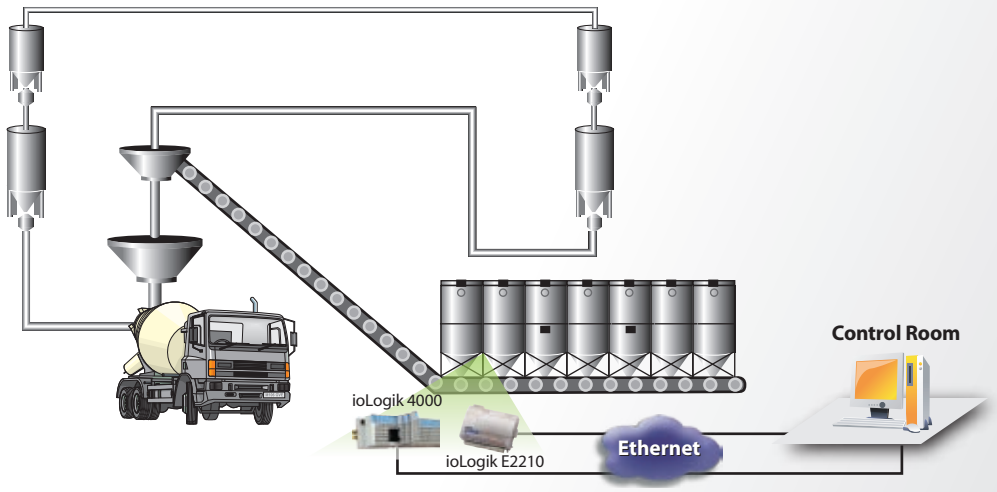
ioLogik E2210

Active Ethernet I/O Server with 12 DI, 8 DO

ioLogik 4000

Expandable Remote I/O Server

Machine Builder



ioLogik E2000 Active Ethernet I/O

New Generation I/O that Talks over Ethernet

Active Ethernet I/O is a new concept for PC-based data acquisition and control that introduces proactive, condition-based reporting and control of I/O devices. Unlike traditional I/O servers, which are passive and must be polled for data, Active Ethernet I/O servers can automatically report and control I/O status based on user-specified conditions. This report-by-exception approach, new to PC-based I/O monitoring, requires far less bandwidth than traditional polling methods. Critical sensor data can be obtained immediately instead being subject to polling intervals.This makes network communication between the host computer and Ethernet I/O server concise and efficient, and makes data transmission 20 times faster compared with traditional SCADA systems (50 ms compared to 1 sec).

The Active Ethernet I/O server is designed for flexible and easy implementation. It supports multiple protocols for data transmission, including TCP/UDP, SNMP trap, SMTP (e-mail), and Modbus/TCP. Condition-based reporting and control can be configured in minutes using the patent-pending, intuitive Click&Go logic interface, which requires no programming knowledge. VB, VC++, and BCB programming libraries are provided for easy integration with user-developed applications. I/O signals can be easily and cost-effectively extended over Ethernet using peer-to-peer I/O communication. This provides duplication of digital or analog signals between Active Ethernet I/O servers at different locations, without a PC or master PLC.

Key Features

- Instant event reporting by TCP, UDP, e-mail, and SNMP trap
- Patented Click&Go logic for easy local control without programming
- API for Windows VB and Windows/WinCE/Linux C
- Peer-to-peer I/O without network controller

Active Ethernet I/O – An efficient and intelligent option for Ethernet I/O

In order to improve enterprise productivity, today's monitoring and data acquisition systems must obtain I/O event information, such as temperature, humidity, and door open/close status, from local and remote sites. Systems have become more distributed in order to handle remote, large scale applications, and they rely heavily on Ethernet and IP-based networks. A key factor in the efficiency of a monitoring system is the way that remote I/O is implemented.

Why choose Active Ethernet I/O?

Click&Go for reduced configuration time

- Local logic control with no learning curve, no third-party programming, and no maintenance fees
- Dramatic reduction in project implementation time

Peer-to-peer I/O for lower costs

- Reduction in cable costs with input-to-output communication over peer-to-peer Ethernet connection
- Signal distribution to multiple locations with no need for PCs, PLCs, or programming
- Signal extension over existing Ethernet infrastructures for areas where physical wiring is difficult
- TFTP for automatic configuration or remote mass deployment

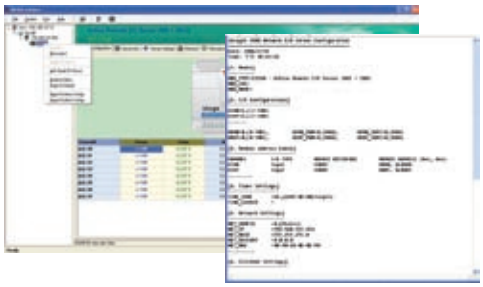
MXIO DLL library for easier programming

- No Modbus addressing required
- VB and VC for Windows support
- Various options for Windows, WinCE, and Linux platforms

TFTP Support

Store and Copy settings for mass deployment using TFTP or Windows utility The Active Ethernet I/O server's configuration, including IP address, I/O configuration, and Click&Go logic can be exported to a file using TFTP or the ioAdmin Windows utility.

You may store the exported file on the computer. When you need to copy the same configuration to another Active Ethernet I/O server on the IP-based network, you may use TFTP or ioAdmin to copy the settings.



TFTP is a simplified FTP protocol that is built into Windows and Linux operating systems. You can use TFTP with a batch file or system shell script to establish an automatic system for upgrading a device's configuration.

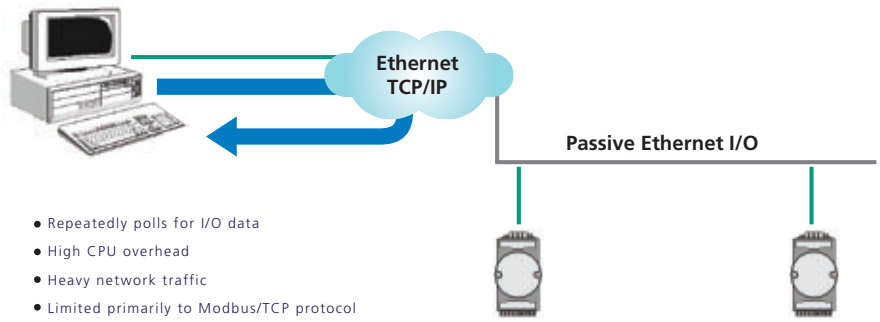
```
tftp 192.168.127.253 put ik2210_1.txt ik2210.txt
tftp 192.168.127.254 put ik2210_2.txt ik2210.txt
```

Active vs. Passive Ethernet I/O

Two types of Ethernet I/O are currently available. Traditional PC-based Ethernet I/O can be considered "passive" Ethernet I/O, where I/O devices cannot operate without instruction from a PC. Active Ethernet I/O, on the other hand, is based on self-directed operation of I/O devices for automated status reporting and simple local control.

Passive Ethernet I/O: Slower response, higher network overhead

In passive Ethernet I/O systems, a host computer obtains data from I/O devices by constantly scanning each device. For LAN environments, obtaining real-time I/O data is possible only when devices are scanned very frequently. However, frequent scanning over the network results in high network overhead.

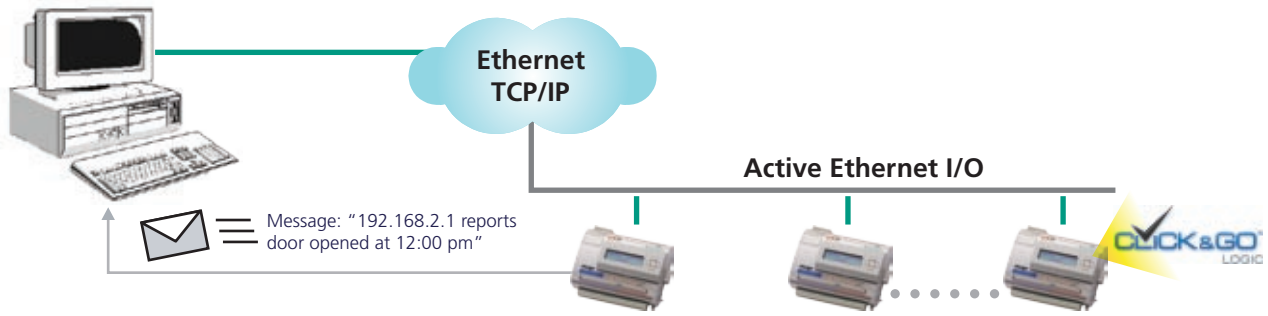


When I/O points are distributed throughout remote locations, response times cannot be guaranteed. This is a challenging situation for programmers when an application demands accurate device timing or instantaneous readings. Typically, the only option for passive Ethernet systems is to install additional local host computers near I/O devices as needed. The local hosts collect I/O data and forward it to a central host computer for actual processing.

Active Ethernet I/O: Proactive event notification, reduced time and cost

Implementation of Active Ethernet I/O is flexible and easy. Active Ethernet I/O servers support multiple protocols for data transmission, including TCP/UDP, SNMP trap, SMTP (e-mail), and Modbus/TCP. Administrators can set up condition-based reporting and control in just minutes using the patent-pending, intuitive Click&Go logic interface, which requires no programming knowledge. VB, VC++, and BCB programming libraries are provided for easy integration with user-developed applications. Peer-to-peer Ethernet communication can be used for cost-effective digital and analog I/O signal extension to multiple locations.

- Provides real-time I/O data to PCs using I/O-triggered instant messages
- Operates without need for field computers
- Supports up to 10 destinations for I/O messages by TCP, UDP, and SNMP trap
- Reduces PC and network overhead by eliminating I/O scanning
- Supports I/O messages with user-defined content and time/date stamp



- Waits for real-time I/O messages
- Low CPU overhead
- Reduced network traffic
- Multiple channels via UDP, TCP, SNMP
- Supports passive remote I/O functions

Comparison of functions

Features	Active I/O	PassiveI/O
Active I/O messaging instead of I/O data polling	√	X
Easy local logic control without programming	√	X
SNMP to I/O support for telecom environments	√	X
Proactive I/O event notification by TCP, UDP, SNMP trap, or e-mail	√	X
VB, VC, BCB programming library for WinCE, Windows platforms	√	X
Linux programming library	√	X
TFTP for remote configuration	√	X
Modbus/TCP support for SCADA software	√	√

Benefits of Active Ethernet I/O

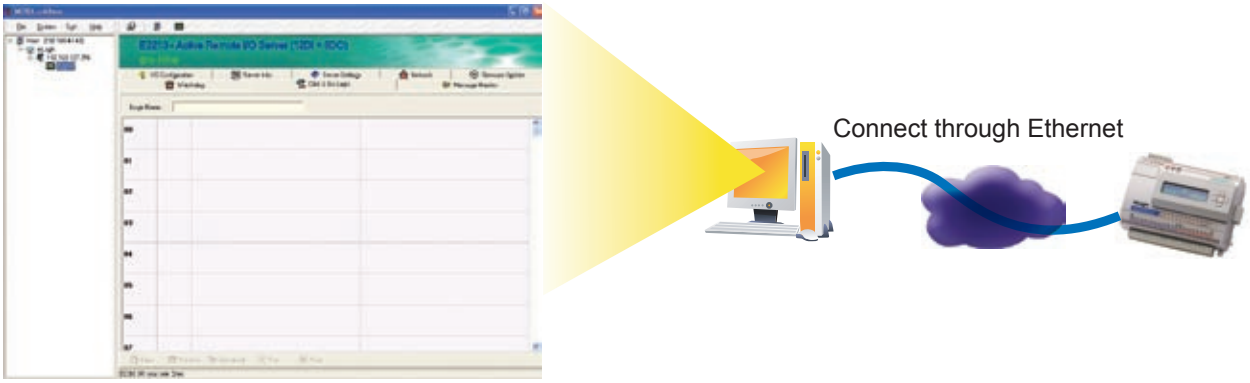
- Provides real-time I/O data to PC using I/O-triggered instant messages; no need to use field computer
- Allows up to 10 computers to receive each active I/O message by TCP/UDP, SNMP trap protocols
- Eliminates I/O scanning, reducing PC and network overhead
- Allows user-defined message content with time/date stamp
- No learning curve, no 3rd party programming, and no maintenance fees
- Dramatically reduces implementation time for projects
- Provides direct input-to-output signal communication across Ethernet using peer-to-peer connection
- Distributes one sensor signal to multiple locations without separate PC or PLC and without programming
- Extends I/O signals using existing copper, fiber, or wireless Ethernet infrastructure
- Saves on cabling costs
- Provides solution for areas where physical wiring is difficult or impossible
- Quick, easy programming that eliminates manual Modbus addressing
- Supports VB and VC for Windows
- Supports Windows, WinCE, and Linux platforms

Click&Go: Four steps to smarter I/O control

Click&Go logic control is the key to turning an ioLogik E2000 server into an intelligent Active Ethernet I/O server. Its intuitive, instantly understandable interface provides sophisticated alarm control and messaging. With Click&Go, you have complete control over what, when, and where to transmit. While programming in C-language or PLC ladder logic requires specialized training, a person who understands basic If-Then statements will instantly understand the Click&Go interface. Using Click&Go, I/O control configuration can be completed without any assistance in just four easy steps.

4 easy steps to configure the control logic

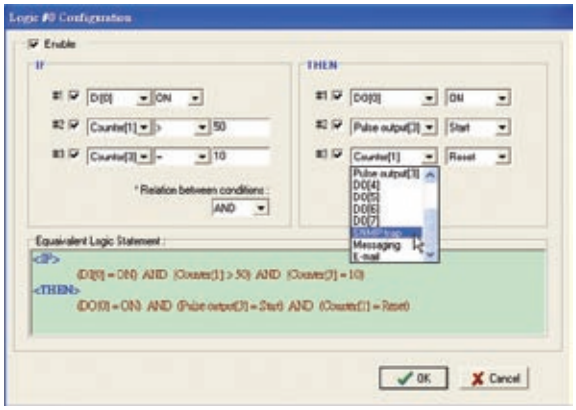
Step 1: Run ioAdmin to access Click&Go



Step 2: Use If-Then statements to define rules

Comprehensive If-Then structure

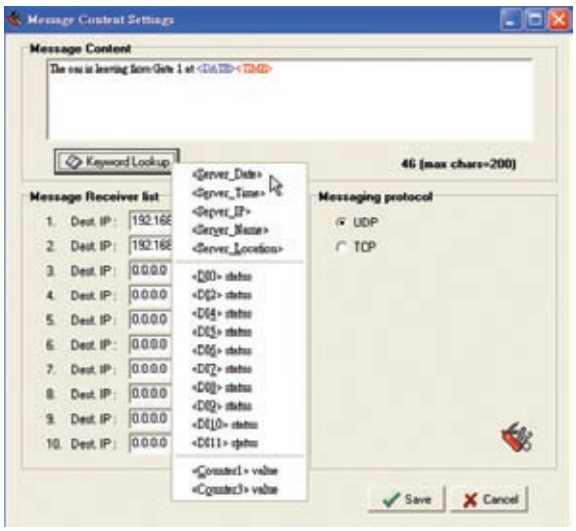
Click&Go logic is based on an If-Then structure that anyone can understand. Each rule consists of up to three conditions ("If" statements) and up to three actions ("Then" statements). This construction can easily be used to set up a simple rule, such as one that pulses a digital output for three seconds if a digital input is activated. It is easy to implement more sophisticated combinations of conditions and actions by using "AND" and "OR" statements.



User-defined content for active I/O messages

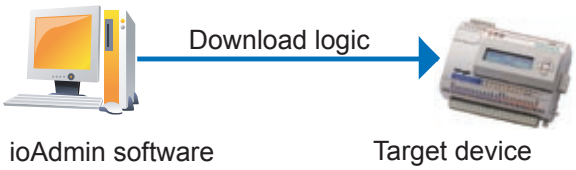
In addition to triggering local output control, Click&Go can be used to trigger network messages that are sent by TCP, UDP, or SNMP trap. This feature allows you to minimize the use of PC resources by eliminating the traditional need to poll for I/O status. With Click&Go and active I/O messaging, your I/O server is both smarter and faster. Network loads are dramatically reduced and exhibit response times within 50 ms instead of 1 sec.

Network messages are user-defined and allow dynamic fields such as exact time, date, and IP address. Click&Go also supports SNMP to I/O, which allows I/O status to be managed by SNMP software without requiring other SCADA software.



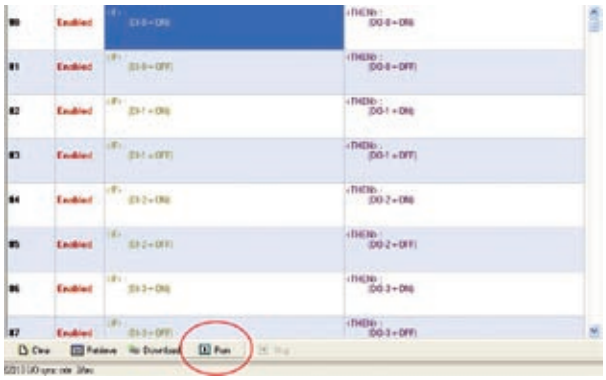
Step 3: Download logic to server

When the I/O control logic has been completely defined, one click in ioAdmin downloads the entire set of rules onto your ioLogik E2000 Ethernet I/O server. The server will automatically restart with the ruleset loaded. Note that the ruleset still needs to be activated for Active Ethernet I/O operation to begin.



Step 4: Run ioAdmin to activate Active Ethernet I/O operation

After your ioLogik server has restarted, ioAdmin will automatically reconnect to the server. Access the Click&Go tab again by logging in as an administrator, then click the "Run" button to activate the control logic.



Conclusion

In just four easy steps, you can set up your own customized control logic for Active Ethernet I/O operation on your ioLogik E2000 Ethernet I/O server.

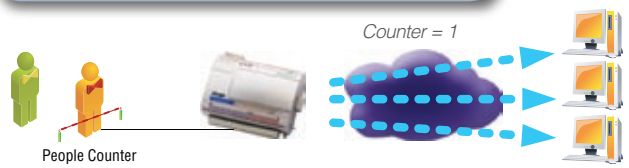
Using Active Ethernet I/O

Active Ethernet I/O is an ideal solution for applications in remote monitoring, data collection, asset/environment control and notification:

- Server rooms for temperature and humidity control, back-up power supply initiation, and more
- Buildings, shopping-centers, and airports for temperature and humidity control
- Roadside cabinets for telecommunication/power industries
- Air-conditioning and heating unit supervision
- Tank level monitoring and pump control
- Door and window sensors in airports and museums
- Warehouse temperature and humidity control
- Medical storage
- Food and chemical industry
- Shopping mall visitor tracking

There are many ways that Active Ethernet I/O can be used to enhance your existing applications, improve your system's cost effectiveness, or help you develop new, more powerful applications.

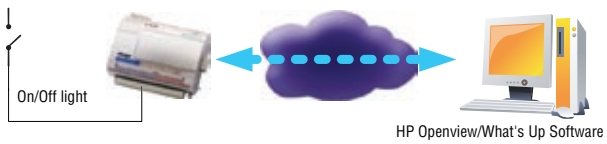
Instant Event Reporting by Input Status



- Improves data acquisition and control system efficiency
- More accurate and timely measurements to prevent data loss

Instead of relying on host computers that continually poll I/O devices for data, Active Ethernet I/O servers can proactively report sensor status using TCP or UDP messages. Proactive messaging allows much faster notification of I/O events and generates much lower network and CPU loads. Message content is fully customizable, and up to 10 simultaneous destinations are supported.

SNMP to I/O (SNMP protocol)



- Supports SNMP read/write/trap
- Supports I/O control using SNMP management software

Active Ethernet I/O can be configured for SNMP management of I/O control and reporting. Customized SNMP traps can be triggered by I/O events like a light switch turning on. SNMP software can be used for sophisticated automation, monitoring, and control of sensors and switches over Ethernet.

Event Mailer (SMTP protocol)

- Send temperature information using SMTP
- User-defined mail content

Active Ethernet I/O can be used for automatic notification of I/O events by e-mail. Messages are completely customizable and can include dynamic fields such as I/O status or current time. This can be used for simple recordkeeping or for instant notification of special problems, such as a power outage or threshold breach.

Local Alarm & Simple I/O Control

- Local intelligence
- No programming

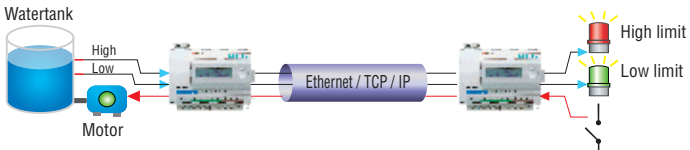
An Active Ethernet I/O server can be used for simple output control that is triggered by input status, without a PC controller. For example, a door sensor can be configured to trigger an alarm. Configuration is done through simple If/Then statements, and no programming is required.

MXIO supports VB/VC/BCB/.Net

- Library for: Windows, Linux, WinCE 5.0
- Visual Basic, Visual C++, Borland C++, Microsoft.NET

The MXIO library allows Active Ethernet I/O to be used across all major platforms. Sensors and switches can be accessed over Ethernet from within user-developed software, for the ultimate in customized management.

Peer-to-Peer I/O without Controller



- Direct input-to-output signal communication
- Reduced cabling extends signal distance and reduces noise

With Active Ethernet I/O, input signals can be easily extended over Ethernet from one server to another, without programming or a separate controller. The ubiquity and flexibility of Ethernet makes this a very powerful way to increase the range of input signals for remote control and monitoring applications. Using Active Ethernet I/O for signal extension also reduces wiring costs, eliminates signal degradation problems, and provides a solution for areas where physical access is limited or difficult.

ioLogik E2212

Active Ethernet I/O Server with 8 DI, 8 DO, and 4 DIO

Features

- Selectable digital I/O combination by software
- Accepts PNP or NPN sensors
- Instant event reporting by TCP/UDP/e-mail/SNMP trap
- Easy local control without programming by patented Click&Go logic
- Windows VB and Windows/WinCE/Linux C API
- Peer-to-Peer I/O without controller

Introduction

Flexible digital input/output configuration within one Ethernet DIO

The ioLogik E2212 provides system integrators with the flexibility to handle various field demands with 8 fixed input channels, 8 fixed output channels, and 4 channels that can be configured by software for input or output operation. You can configure the I/O channels to suit your needs, for combinations such as 12 inputs/8 outputs, 8 inputs/12 outputs or 10 inputs/10 outputs.

Single Ethernet DIO that accepts 3 types of sensors

Unlike traditional Ethernet I/O products, the ioLogik E2212 can connect to dry contact, PNP, and NPN sensors at the same time. You may decide on the sensor type depending on your wiring approach.

Specifications

LAN

Ethernet: 10/100 Mbps, RJ45

Protection: 1.5KV magnetic isolation

Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP(MIB for I/O and Network), HTTP, SNTP

Active I/O Messages: Yes

Security: IP-filtering

Serial

Interface: RS-485 (2-wire): Data+, Data-, GND

Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None

Data Bits: 8

Stop Bit(s): 1

Flow Control: None

Speed: 1200 to 115200 bps

Protocol: Modbus/RTU

Power Requirements

Power Input: 24 VDC nominal, min. 12 VDC, Max. 48 VDC

DO Power: 24 VDC nominal, up to 30 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environment

Operation Temperature: -10 to 60°C (14 to 140°F), 5 to 95% RH

Storage Temperature: -40 to 85°C (-40 to 185°F), 5 to 95% RH

Digital Input

Channels: 8 fixed points

Sensor Type: 2 6-point groups for NPN/PNP type

I/O Mode: DI or Event Counter (up to 900Hz)

Dry Contact: Logic 0: short to GND, Logic 1: open

Wet Contact: Logic 0: 0 to 3 VDC,
Logic 1: 10 to 30 VDC (DI COM to DI)

Common Type: 6 points /1 COM

Isolation: 3K VDC

Specifications

Low Speed Counter/Frequency: 900 Hz, power off storage
Over Voltage Protection: +36 VDC
Counter Memory: 48 Bytes

Digital Output

Channels: 8 fixed points sink, 48 VDC, 200 mA
Magnetic Isolation: 2 KVrms/3K VDC
Pulse Wave Width: 10 ms/100 Hz
Over Voltage Protection: +50 VDC
Over Current Limit: 600 mA (typical)
Over Temperature Shutdown: 160°C (min.)

DI/DO Selectable Channels

Channels: 4
I/O Mode: DI or Event Counter (Up to 900Hz)
DO or Pulse Output (Up to 100Hz)
Magnetic Isolation: 2 KVrms/3K VDC

Agency Approvals

EMI: FCC part 15, CISPR (EN55022) Class A
EMS: IEC 61000-4-2 (ESD), Level 2/3
IEC 61000-4-3 (RS), Level 2
IEC 61000-4-4 (EFT), Level 2
IEC 61000-4-5 (Surge), Level 3
IEC 61000-4-6 (CS), Level 2
IEC 61000-4-8 (PM), Level 1
IEC 61000-4-11 (DIP)
IEC 61000-6-2
IEC 61000-6-4 (EMC)
Safety: UL 508
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Warranty: 2 years

Pin Assignment

Power & RS-485

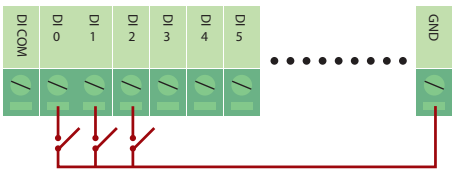
(Power Input)			(RS-485)		
1	2	3	4	5	6
V+ (12-48 V)	V-	FG	Data+	Data-	SG

I/O (left to right)

1	2	3	4	5	6	7	8	9	10	11	12	12	14	15	16	17	18	19	20	21	22	23	24
DI COM1	DI 0	DI 1	DI 2	DI 3	DI 4	DI 5	DI COM2	DI 6	DI 7	DIO 8	DIO 9	DIO 10	DIO 11	GND	DO 0	DO 1	DO 2	DO 3	DO 4	DO 5	DO 6	DO 7	DO PWR

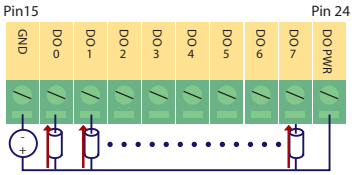
Wiring Example

Digital Input (Dry Contact)



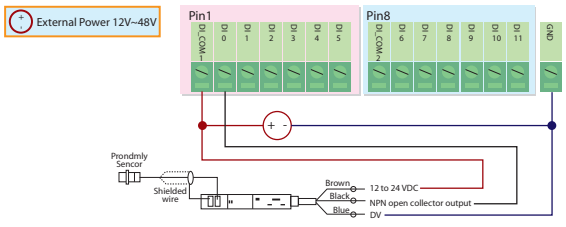
(1) Dry Contact

Digital Output



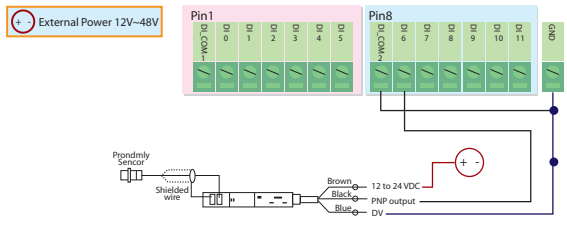
(2) Digital Output

Digital Input (Wet Contact)



(3) Wet Contact with NPN Sensor

Digital Output



(4) Wet Contact with PNP Sensor

Ordering Information

ioLogik E2212: Active Ethernet I/O server
LDP1602: LCD module with 16 x 2 text and 5 button

ioLogik E2210

Active Ethernet I/O Server with 12 Digital Inputs, 8 Digital Outputs

CONTROL ENGINEERING 2006 ENGINEERS' CHOICE AWARDS

Features

- Actively transfer I/O data in real-time over Ethernet
- Easy-to-use Click&Go™ Logic for local output control and messaging
- 12-point 24 VDC digital input with DI/Event counter
- 8-point 24 VDC digital output as pulse output
- 10/100 Mbps Ethernet with Modbus/TCP protocol connecting up to 10 hosts
- SNMP to I/O mapping that works with Network Management System
- Quick programming library for VB, VC, BCB

Introduction

Linking Digital Inputs and Outputs to TCP/IP Ethernet Networks

The ioLogik E2210 is designed to allow system integrators to acquire and control on/off devices remotely over TCP/IP and Ethernet networks. On/off devices may include proximity switches, mechanical switches, push buttons, optical sensors, LEDs, and light switches. The ioLogik E2210 supports multiple protocols over Ethernet, such as Modbus/TCP, SNMP, HTTP, TCP, and UDP at 100 Mbps for high speed data acquisition. Data can be distributed to up to 10 host computers.

Independent Configuration for Multi-Functional DI and DO Channels

Each digital input can be independently configured for DI or Event Counter mode, and each digital output can be independently configured for DO or Pulse Output mode.

Specifications

LAN

Ethernet: 10/100 Mbps, RJ45

Protection: 1.5 KV magnetic isolation

Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP (MIB for I/O and Network), HTTP, SNTP

Active I/O Messages: Yes

Security: IP-filtering

Serial

Interface: RS-485 (2-wire): Data+, Data-, GND

Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None

Data Bits: 8

Stop Bits: 1

Flow Control: None

Speed: 1200 to 115200 bps

Protocol: Modbus/RTU

Built-in Real Time Clock: Yes

Power Requirements

Power Input: 24 VDC nominal, min. 12 VDC, Max. 48 VDC

Power Consumption: 282 mA @ 24 VDC (typ.)

DO Power: 24 VDC nominal, up to 36 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environment

Operating Temperature: -10 to 60°C (14 to 140°F), 5 to 95% RH

Storage Temperature: -40 to 85°C (-40 to 185°F), 5 to 95% RH

Digital Input

Inputs: 12, source type

Specifications

I/O Mode: DI or Event Counter (up to 900 Hz)

Dry Contact: Logic 0: short to GND, Logic 1: open

Wet Contact: Logic 0: 0 to 3 VDC,
Logic 1: 10 to 30 VDC (DI COM to DI)

Common Type: 12 points / 1 COM

Isolation: 3K VDC

Digital Output

Outputs: 8, sink type

I/O Mode: DO or Pulse Output (up to 1 KHz)

On-state Voltage: 24 VDC nominal

Output Current Rating: Max. 200 mA per channel

Optical Isolation: 3K VDC

Protection: Over temperature shutdown: Min. 170°C
Over current limit: typ. 750 mA/channel

Agency Approvals

EMI: FCC Part 15, CISPR (EN55022) Class A

EMS: IEC61000-4-2 (ESD), Level 2/3
IEC61000-4-3 (RS), Level 2
IEC61000-4-4 (EFT), Level 2
IEC61000-4-5 (Surge), Level 3
IEC61000-4-6 (CS), Level 2
IEC61000-4-8 (PM), Level 1
IEC61000-4-11 (Dip)
EN61000-6-2
EN61000-6-4(EMC)

Safety: UL 508

Shock: IEC60068-2-27

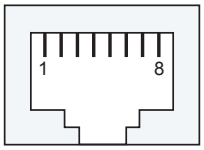
Freefall: IEC60068-2-32

Vibration: IEC60068-2-6

Warranty: 2 years

Pin Assignment

Ethernet



Pin	Signals
1	Tx+
2	Tx-
3	Rx+
6	Rx-

Power and RS-485

Pin	1	2	3	4	5	6
Signal	V+	V-	FG	D+	D-	SG

I/O (left to right)

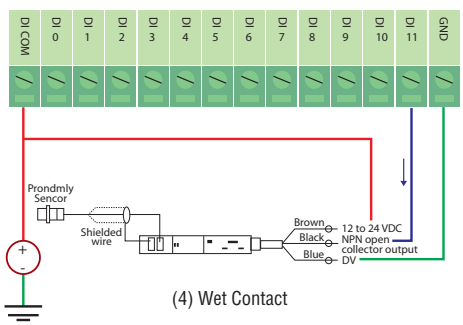
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DI COM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	DI9	DI10	DI11	DI. GND	DO.PWR	DO0	DO1	DO2	DO3	DO4	DO5	DO6	DO7	DO.GND

Wiring Example

Digital Input (Dry Contact)

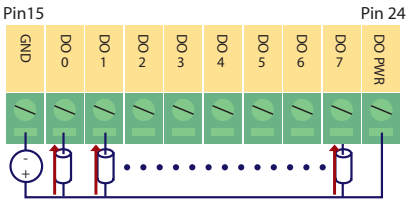
(1) Dry Contact

Digital Input (Wet Contact)



(4) Wet Contact

Digital Output



(2) Digital Output

Ordering Information

ioLogik E2210: Active Ethernet I/O server with 12 digital inputs and 8 digital outputs

LDP1602: LCD module with 16 x 2 text and 5 button

ioLogik E2240

Active Ethernet I/O Server with 8 Analog Inputs, 2 Analog Outputs

Features

- Actively transfer I/O data in real-time over Ethernet
- Easy-to-use Click&Go™ Logic for local output control and messaging
- 8-channel analog input for mV, voltage, current signal with wire-off detection (at 4-20mA)
- 2-channel analog output for voltage, current actuator control
- Connects up to 10 hosts
- SNMP to I/O mapping that works with Network Management System
- Quick programming library for VB, VC, BCB
- NIST-traceable calibration

Introduction

Linking Analog Inputs and Outputs to TCP/IP Ethernet Networks

The ioLogik E2240 is designed for system integrators to acquire and control remote sensors and actuators remotely over TCP/IP and Ethernet networks. Types of sensors and actuators include pH, conductivity, temperature, humidity, pressure, flow, actuator, and valves. The ioLogik E2240 supports Ethernet and can run multiple protocols, such as Modbus/TCP, SNMP, HTTP, TCP, UDP at 100 Mbps for high speed data acquisition. Data can be distributed to up to 10 host computers.

Independent Configuration for Multi-Functional AI and AO Channels

Each analog input can be independently configured by software to voltage or current mode. The analog input channels support various signals ranging from +/-150 mV to +/-10V at 16-bit resolution.The analog output channels support 0 to 10V and 4 to 20 mA @ 12-bit resolution.

Specifications

LAN

Ethernet: 10/100 Mbps, RJ45

Protection: 1.5 KV magnetic isolation

Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP(MIB for I/O and Network), HTTP, SNTP

Active I/O Messages: Yes

Security: IP-filtering

Serial

Interface: RS-485 (2-wire): Data+, Data-, GND

Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None

Data Bits: 8

Stop Bits: 1

Flow Control: None

Speed: 1200 to 115200 bps

Protocol: Modbus/RTU

Built-in RTC: Yes

Power Requirements

Power Input: 24 VDC nominal, min. 12VDC, Max. 48VDC

Power Consumption: 282 mA @ 24V DC (typ.)

DO Power: 24 VDC nominal, up to 36 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environment

Operating Temperature: -10 to 60°C (14 to 140°F), 5 to 95%RH

Storage Temperature: -40 to 85°C (-40 to 185°F), 5 to 95%RH

Shock: IEC60068-2-27

Specifications

Freefall: IEC60068-2-32

Vibration: IEC60068-2-6

Analog Input

Input: 8

Resolution: 16-bit

Input Range: +/-150 mV, +/-500 mV, +/-5 V, +/-10 V, 0 to 20 mA, 4 to 20 mA

Data Format: 16-bit integer (2's complement)

Accuracy: +/- 0.1%, FSR @ 25°C, +/- 0.3%, FSR @ -10, 60°C

Sampling Rate (All Channels): 10 samples/sec (voltage)
6 samples/sec (current)

Input Impedance: 900k Ohm

Built-in Resistor for Current Input: 125 Ohm

Optical Isolation: 3K VDC

Overvoltage: Can withstand continuous overvoltage (protection range -10V to 10V)

Analog Output

Outputs: 2

Resolution: 12-bit

Output Range: 0 to 10V, 4 to 20 mA

Drive Voltage: 15 VDC for current output

Data Format: 16-bit integer (2's complement)

Accuracy: +/- 0.1%, FSR @ 25°C, +/- 0.3%, FSR @ -10, 60°C

CMR @ 50/60 Hz: 95 dB min.

Zero Drift: +/- 9 μV/°C

Span Drift: +/- 25 ppm/°C

Load Resistor: < 250 Ohm

Agency Approvals

EMI: FCC Part 15, CISPR (EN55022) Class A

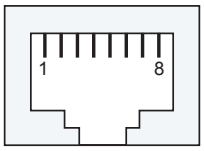
EMS: IEC61000-4-2 (ESD), Level 2/3, IEC61000-4-3 (RS), Level 2, IEC61000-4-4 (EFT), Level 2, IEC61000-4-5 (Surge), Level 3, IEC61000-4-6 (CS), Level 2, IEC61000-4-8 (PM), Level 1, IEC61000-4-11 (Dip)

Safety: UL 508

Warranty: 2 years

Pin Assignment

Ethernet



Pin	Signals
1	Tx+
2	Tx-
3	Rx+
6	Rx-

Power and RS-485

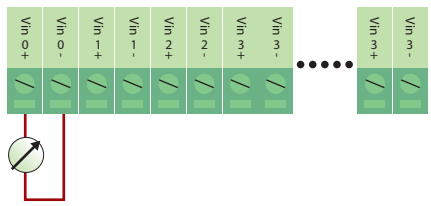
Pin	1	2	3	4	5	6
Signal	V+	V-	FG	D+	D-	SG

I/O (left to right)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Vin0+	Vin0-	Vin1+	Vin1-	Vin2+	Vin2-	Vin3+	Vin3-	Vin4+	Vin4-	Vin5+	Vin5-	Vin6+	Vin6-	Vin7+	Vin7-	Vout0+	Vout0-	Iout0+	Iout0-	Vout1+	Vout1-	Iout1+	Iout1-

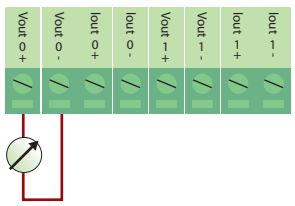
Wiring Example

Analog Input



(1) Digital Input

Analog Output



(2) Digital Output

Ordering Information

ioLogik E2240: Active Ethernet I/O server with 8 analog inputs and 2 analog outputs

LDP1602: LCD module with 16 x 2 text and 5 button

ioMirror E3000 Peer-to-Peer I/O Servers

Direct input-to-output communication over an IP network

The ioMirror E3000 Ethernet I/O server is designed as a cable replacement solution that sends input signals to remote outputs over an Ethernet or IP network. ioMirror servers can be used to connect remote sensor signals to PLC controllers, DCS systems, or display devices over a network, without installing additional signal wires.

The easiest way to connect input signals to remote outputs over an IP network

Configuration of ioMirror servers is easy using ioAdmin for Windows. With ioAdmin, input-to-output signal mapping between ioMirror servers can be configured from a local or remote host. Basic Configuration, which is also available in the web console, is used for simple mapping of all channels from box to box. Advanced Configuration is used for customized channel-to-channel mapping and allows one input channel to be mapped to multiple output channels. ioAdmin also provides a graphical representation of ioMirror server relationships complete with signal direction, making it easy to map signals quickly and accurately.

Take advantage of existing Ethernet infrastructure

Why spend extra effort laying down additional signal wires if you already have a high-speed Ethernet infrastructure? Modern LANs, whether Ethernet, fiber optic, or wireless, already provide the necessary high-speed connectivity. General input/output signals can be carried by a pair of ioMirror I/O servers, making wiring simpler than ever.

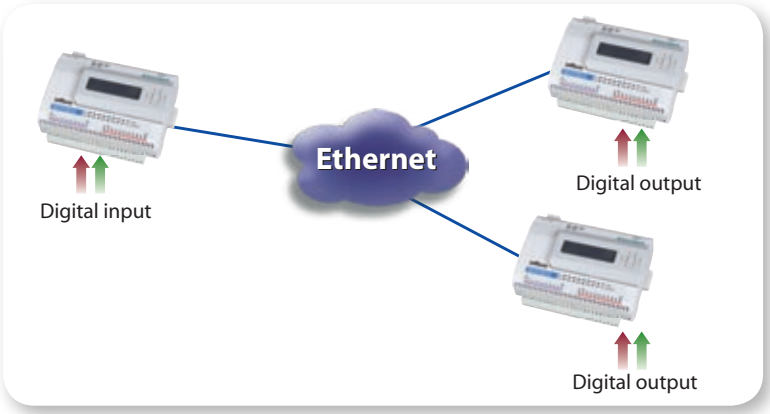
No PLC or PC controllers, and no programming

Unlike traditional solutions, a PLC or PC is not required as a controller to transmit input signals over a network. The ioMirror hardware handles all signal mapping automatically, with no ladder or C programming required.

With ioMirror, input signals can be easily extended over Ethernet from one server to another, without programming or a separate controller. The ubiquity and flexibility of Ethernet makes this a very powerful way to increase the range of input signals for remote control and monitoring applications. Using ioMirror for signal extension also reduces wiring costs, eliminates signal degradation problems, and provides a solution for areas where physical access is limited or difficult.

Simultaneously send input signals to two locations

The ioMirror E3000 can send one input signal simultaneously to two digital outputs over the network. This function could be used, for example, to monitor tank levels from two different display panels.



Easy and flexible installation

Installation of ioMirror E3000 servers is easy using the Windows utility that is provided. If all channels are simply mapped from one module to another, you may simply assign the remote IP address. For more sophisticated mapping, individual channels can be mapped quickly and easily using the comprehensive graphical interface.

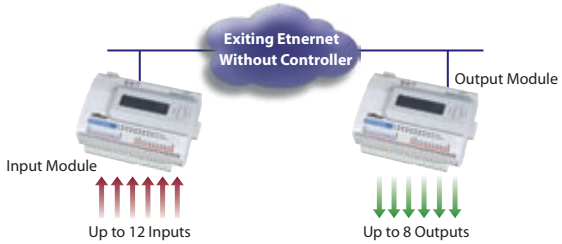
Useful troubleshooting tools

Many useful tools are provided that help keep you informed about the health and performance of your ioMirror E3000 servers and connections.

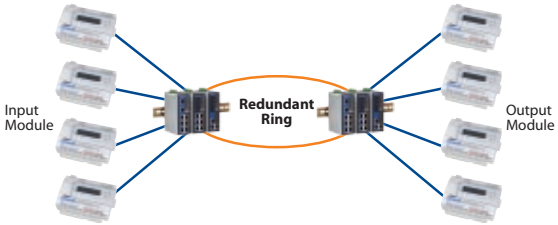
- Optional LCD attachment for local IP configuration
- Alarm port for 24 VDC alarm devices, such as pole displays, LEDs, buzzers
- Remote alarm and independent event log that records each connection and disconnection
- Windows utility that graphically displays operational status and ioMirror mapping relationships
- Fast recovery after network disconnection
- Modbus/TCP support for SCADA connectivity

ioMirror servers in different network infrastructures

#1 Ethernet network



#2 Fiber Ethernet network



#3 Wireless LAN network

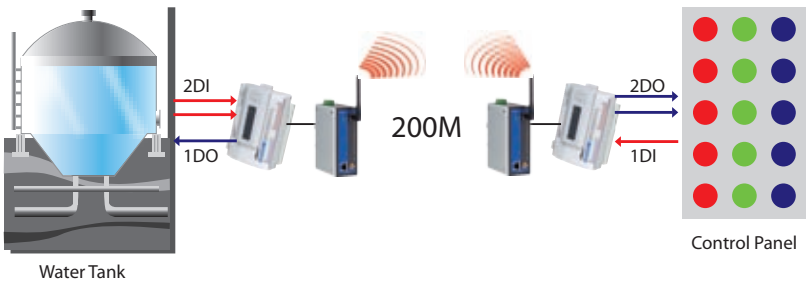
Lower wiring costs for industrial or business automation

ioMirror is the easiest and fastest way to connect input signals to remote outputs over Ethernet and IP networks. It is ideal for monitoring or for applications that are not mission critical. Using ioMirror servers, maximum signal transmission distance can be obtained with no programming and no controller.

- Remote signal display
- Signal splitting
- System monitoring
- Tank level monitoring with pump and valve control
- Power station monitoring
- Telecom machine room monitoring
- Security system for factory, office, or public building

Real-world application for ioMirror in tank monitoring panel

This real-world application involves ioMirror servers in the vegetable oil industry, where oil tank levels are monitored constantly. The customer uses a computer-based SCADA system for general management and control, with an LED panel in the control room for direct monitoring of tank levels. Using the LED panel originally meant maintaining 200m of copper wire dedicated to 24 V signals, which was a significant challenge. With the ioMirror Ethernet I/O server, the existing fiber network could be used instead. The level sensor simply connects to an ioMirror server, which is connected to the network. Sensor signals are automatically forwarded over the network to another ioMirror server, which sends matching 24 VDC digital output signals directly to the LED. The ioMirror system was so easy to set up that the customer completed the project in just a few days, at very little cost.



ioMirror E3210

Ethernet Peer-to-Peer I/O Server 8 Digital Inputs, 8 Digital Outputs

Features

- Remote digital input mapped to local digital output over Ethernet
- High speed peer-to-peer I/O
- Copy sensor signals to up to sixteen locations
- Quick and easy utility and web-based settings
- Local alarm and remote alarm message
- Support Modbus/TCP for remote monitoring

Introduction

Direct input-to-output communication over IP

The ioMirror E3000 Ethernet I/O server is designed as a cable-replacement solution that connects remote digital input signals to output signals over an IP network. The ioMirror E3210 provides 8 digital input and 8 digital output channels and a 10/100M Ethernet interface. Up to 8 pairs of digital input and output signals can be exchanged over Ethernet with another ioMirror E3210 as well as to a local PLC or DCS controller. Over a local area network, the ioMirror achieves low signal latency, typically 20 ms. With ioMirror servers, remote sensors can now be connected to local controllers or display panels over copper, fiber, or wireless Ethernet infrastructures. Signals can be transmitted over virtually unlimited distances, without noise problems.

Split sensor signals to sixteen different locations

The ioMirror E3000 can split one input signal to two digital output channels at two different IP addresses. Eight tank level signals could be monitored at sixteen different display panels at the same time.

Local alarm with remote alarm messages to monitor connectivity

The ioMirror E3210 has a 24 VDC alarm output channel that can activate an attached buzzer or display LED when the connection fails. In addition, both ioMirror modules can send messages to the event log software. This ensures that at least one of the warning messages will reach the event log software.

Specifications

LAN

Ethernet: 10/100 Mbps, RJ45

Protection: 1.5 KV magnetic isolation

Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP(MIB for I/O and Network), HTTP, SNTP

Power Requirements

Power Input: 24 VDC nominal, min 12 VDC, max 48 VDC

DO Power: 24 VDC nominal, up to 36 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environmental

Operation Temperature: -10 to 60°C (14 to 140°F), 5 to 95% RH

Storage Temperature: -40 to 85°C (-40 to 185°F), 50 to 95% RH

Digital Input

Inputs: 8, source type

I/O Mode: Digital Input

Dry Contact: Logic 0: close to GND
Logic 1: open

Wet Contact: Logic 0: 0 to 3 VDC
Logic 1: 10 to 30 VDC

Isolation: 2 KVrms

Common Type: 8 points/1 COM

Stored Counter Value: Yes

Digital Output

Output: 8, sink type

I/O Mode: Digital Output

Specifications

On-status Voltage: 24 VDC (typical)

Output Current Rating: Max. 200 mA per channel

Optical Isolation: 2 kVrms/3K VDC

Protection:
Over Voltage Protection: +50 VDC
Over Current Limit: 600 mA (typical)
Over Temperature Shutdown: 160°C (min.)

Alarm Port Output

Output: 1, sink type

On-status Voltage: 24 VDC (typical)

Output Current Rating: Max. 200 mA per channel

Optical Isolation: 2 KVrms/3K VDC

Agency Approvals

EMI: FCC part 15, CISPR (EN55022) Class A

EMS: IEC 61000-4-2 (ESD), Level 2/3
IEC 61000-4-3 (RS), Level 2
IEC 61000-4-4 (EFT), Level 2
IEC 61000-4-5 (Surge), Level 3
IEC 61000-4-6 (CS), Level 2
IEC 61000-4-8 (PM), Level 1
IEC 61000-4-11 (DIP)
IEC 61000-6-2
IEC 61000-6-4 (EMC)

Safety: UL 508

Shock: IEC 60068-2-27

Freefall: IEC 60068-2-32

Vibration: IEC 60068-2-6

Warranty: 2 years

Pin Assignment

Power and RS-485

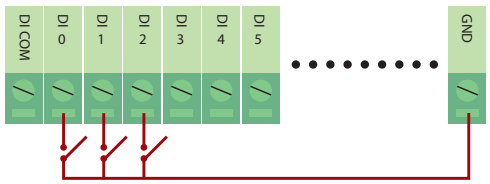
(Power Input)		
1	2	3
V+ (12-48 V)	V-	FG

I/O (left to right)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DI COM1	DI 0	DI 1	DI 2	DI 3	DI 4	DI 5	DI 6	DI 7				Alarm	DO Power	GND	DO 0	DO 1	DO 2	DO 3	DO 4	DO 5	DO 6	DO 7	GND

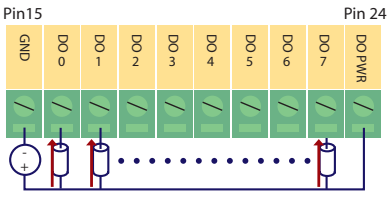
Wiring Example

Digital Input (Dry Contact)



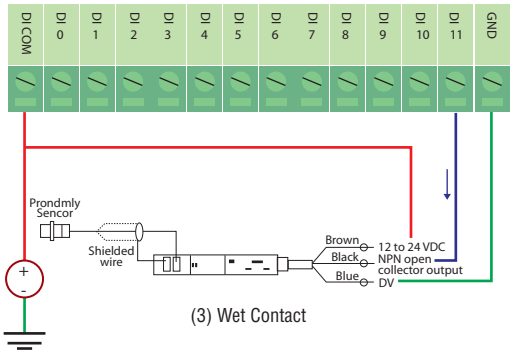
(1) Dry Contact

Digital Output



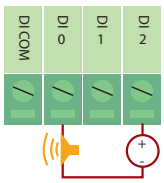
(2) Digital Output

Digital Input (Wet Contact)



(3) Wet Contact

Alarm Port



(4) Alarm Output

Ordering Information

ioMirror E3210: Peer-to-peer I/O server with 8 digital inputs and 8 digital outputs

LDP1602: LCD module with 16 x 2 text and 5 button

ioLogik R2000 Serial Remote I/O Servers

Linking Input and Output Signals over RS-485

The ioLogik R2000 series was designed for system integrators to acquire and control remote digital and analog devices over RS-485. Types of digital on/off devices include proximity switches, mechanical switches, push buttons, optical sensors, LEDs, and light switches. Types of analog devices include pH, conductivity, temperature, humidity, pressure, flow, actuator, and valves.

The ioLogik R2000 series of servers can work with the standard Modbus protocol. SCADA software or the MXIO DLL library may be used to access the server.

Full Range of DI/O and AI/O Models

RS-485 is most common wiring standard in many industries. MOXA now offers a high quality line of remote I/O servers that support RS-485 and provide upgraded functions.

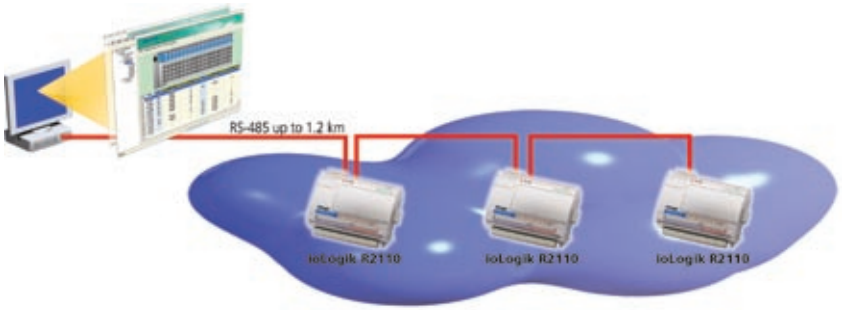
- Multi-functional digital I/O with DI/Event Counter and DO/Pulse Output modes
- Multi-function analog I/O with mA/mV/Voltage modes
- Over-current and over-voltage protection
- PLC-grade I/O design that ensures accuracy and reliability during field operation
- Remote management of firmware upgrades over RS-485 network

Independent Configuration of Multi-Functional DI/DO and AI/AO Channels

Each input signal can be independently configured, with DI/Event Counter modes available for digital inputs and voltage/current modes available for analog inputs. Each digital output can be independently configured for DO or Pulse Output mode. The analog input channels support various signals ranging from +/-150 mV to +/-10V at 16-bit resolution. The analog output channels support 0 to 10V and 4 to 20 mA @ 12-bit resolution.

Easy Management of Firmware Over RS-485

Traditionally, it was difficult for users to update firmware over RS-485. MOXA now provides an easy method for updating firmware over an RS-485 network. This allows users to perform remote firmware updates, reducing maintenance time and cost.



Snap-On LCD Module

Traditionally, a PC was required in order to configure a remote I/O server. MOXA offers the optional snap-on LCD module as an easier way to configure and monitor ioLogik E2000 and R2000 servers.

The LCD module is hot-pluggable, so it may be installed or removed without turning the server off.

ioLogik R2110

RS-485 Remote I/O Server with 12 Digital Inputs, 8 Digital Outputs

Features

- 12-point 24 VDC digital input with DI/Event Counter mode, software selectable filtering time
- 8-point 24 VDC digital output with Pulse Output mode, software selectable pulse width
- LED indicators for all I/O channels
- Over temperature protection (up to 170°C)
- Over-current protection (750 mA/channel)
- Easy-to-use, quick programming lib for VB, VC++, BCB
- Easy firmware upgrade over RS-485

Specifications

Serial

Interface: RS-485 (2-wire): Data+, Data-, GND

Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None

Data Bits: 8

Stop Bits: 1

Flow Control: None

Speed: 1200 to 115200 bps

Protocol: Modbus/RTU

Power Requirements

Power Input: 24 VDC nominal, min 12 VDC, max 48 VDC

Power Consumption: 195 mA @ 24 VDC (typ.)

DO Power: 24 VDC nominal, up to 36 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environment

Operating Temperature: -10 to 60°C (14 to 140°F), 5 to 95% RH

Storage Temperature: -40 to 85°C (-40 to 185°F), 5 to 95% RH

Digital Input

Inputs: 12, source type

I/O Mode: DI or Event Counter (up to 50 Hz)

Dry Contact: Logic 0: short to GND, Logic 1: open

Wet Contact: Logic 0: 0 to 3 VDC, Logic 1: 10 to 30 VDC (DI COM to DI)

Common Type: 12 points / 1 COM

Isolation: 3K VDC

Digital Output

Outputs: 8, sink type

I/O Mode: DO or Pulse output (up to 50 Hz)

On-state Voltage: 24 VDC nominal

Output Current Rating: Max. 200 mA per channel

Optical Isolation: 3K VDC

Protection: Over temperature shutdown: Min. 170°C
Over current limit: typ. 750 mA/channel

Output frequency: 50 Hz

Agency Approvals

EMI: FCC Part 15, CISPR (EN55022) Class A

EMS: IEC61000-4-2 (ESD), Level 2/3; IEC61000-4-3 (RS), Level 2; IEC61000-4-4 (EFT), Level 2; IEC61000-4-5 (Surge), Level 3; IEC61000-4-6 (CS), Level 2; IEC61000-4-8 (PM), Level 1; IEC61000-4-11 (Dip)
EN61000-6-2
EN61000-6-4 (EMC)

Safety: UL 508

Shock: IEC60068-2-27

Freefall: IEC60068-2-32

Vibration: IEC60068-2-6

Warranty: 2 years

Pin Assignment

Power and RS-485

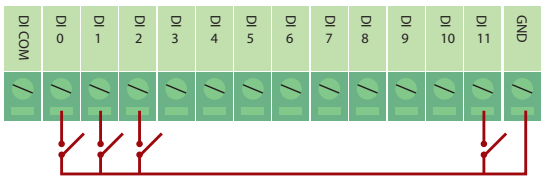
Pin	1	2	3	4	5	6
Signal	V+	V-	FG	D+	D-	SG

I/O (left to right)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DI COM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	DI9	DI10	DI11	DI. GND	DO.PWR	DO0	DO1	DO2	DO3	DO4	DO5	DO6	DO7	DO.GND

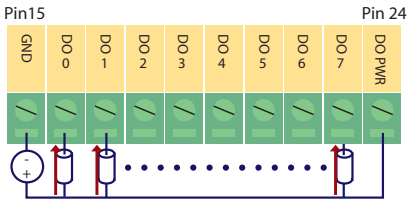
Wiring Example

Digital Input (Dry Contact)



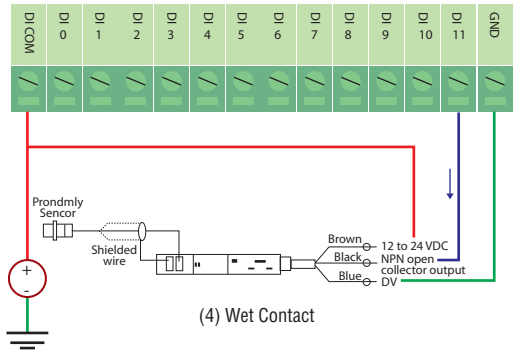
(1) Dry Contact

Digital Output



(2) Digital Output

Digital Input (Wet Contact)



(4) Wet Contact

Ordering Information

ioLogik R2210: RS-485 remote I/O server with 12 digital inputs and 8 digital outputs

LDP1602: LCD module with 16 x 2 text and 5 button

ioLogik R2140

RS-485 Remote I/O Server with 8 Analog Inputs, 2 Analog Outputs

Features

- 8-channel analog input for mV, voltage, current signal with wire-off detection (at 4 to 20 mA)
- 2-channel analog output for voltage, current actuator control
- 16-bit resolution analog input, 12-bit resolution analog output
- Easy-to-use, quick programming lib for VB, VC++, BCB
- NIST-Traceability calibration for analog I/O channels
- Easy firmware upgrade over RS-485

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Specifications

Serial

Interface: RS-485 (2-wire): Data+, Data-, GND

Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None

Data Bits: 8

Stop Bits: 1

Flow Control: None

Speed: 9600 to 115200 bps

Protocol: Modbus/RTU

Built-in RTC: Yes

Power Requirements

Power Input: 24 VDC nominal, min 12 VDC, max 48 VDC

Power Consumption: 195 mA @ 24 VDC (typ.)

DO Power: 24 VDC nominal, up to 36 VDC

Mechanical Specifications

Wiring: I/O cable max. 14 AWG

Environmental

Operating Temperature: -10 to 60°C (14 to 140°F), 5 to 95%RH

Storage Temperature: -40 to 85°C (-40 to 185°F), 5 to 95%RH

Shock: IEC60068-2-27

Freefall: IEC60068-2-32

Vibration: IEC60068-2-6

Analog Input

Input: 8

Resolution: 16-bit

Input Range: +/-150 mV, +/-500 mV, +/-5 V, +/-10 V, 0 to 20 mA, 4 to 20 mA

Data Format: 16-bit integer

Accuracy: +/- 0.1%, FSR @ 25°C, +/- 0.3%, FSR @ -10, 60°C

Sampling Rate: 10 samples/sec (voltage), 6 samples/sec (current)

Built-in Resistor for Current Input: 125 Ohm

Optical Isolation: 3K VDC

Overvoltage: Can withstand continuous overvoltage (protection range -10V to 10V)

Analog Output

Outputs: 2

Resolution: 12-bit

Output Range: 0 to 10V, 4 to 20 mA

Drive Voltage: 15 VDC for current output

Accuracy: +/- 0.1%, FSR @ 25°C, +/- 0.3%, FSR @ -10, 60°C (current) CMR @ 50/60 Hz: 95 dB min.

Zero Drift: +/- 9 µV/°C

Span Drift: +/- 25 ppm/°C

Load Resistor: < 250 Ohm

Agency Approvals

EMI: FCC Part 15, CISPR (EN55022) Class A

EMS: IEC61000-4-2 (ESD), Level 2/3, IEC61000-4-3 (RS), Level 2, IEC61000-4-4 (EFT), Level 2, IEC61000-4-5 (Surge), Level 3, IEC61000-4-6 (CS), Level 2, IEC61000-4-8 (PM), Level 1, IEC61000-4-11 (Dip)

Safety: UL 508

Warranty: 2 years

Pin Assignment

Power and RS-485

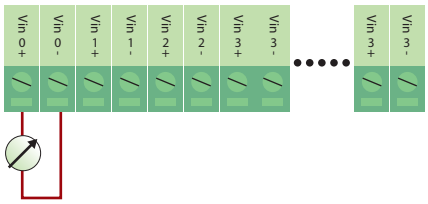
Pin	1	2	3	4	5	6
Signal	V+	V-	FG	D+	D-	SG

I/O (left to right)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Vin0+	Vin0-	Vin1+	Vin1-	Vin2+	Vin2-	Vin3+	Vin3-	Vin4+	Vin4-	Vin5+	Vin5-	Vin6+	Vin6-	Vin7+	Vin7-	Vout0+	Vout0-	Iout0+	Iout0-	Vout1+	Vout1-	Iout1+	Iout1-

Wiring Example

Analog Input



(1) Digital Input Example

Analog Output

(2) Digital Output

Ordering Information

ioLogik R2140: RS-485 remote I/O server with 8 analog inputs and 2 analog outputs

LDP1602: LCD module with 16 x 2 text and 5 button

LDP1602 LCD Module

LDP1602 LCD Module for ioLogik 2000 Series

Features

- Hot-pluggable display module for ioLogik Active Ethernet I/O and serial remote I/O servers
- Easy, portable configuration kit for IP display and configuration
- Direct display for analog value and digital input, counter status
- No battery required (powered by I/O server)
- Supports ioLogik E2000 series, ioLogik R2000 series and ioMirror E3000 series

Installing the LCD Module

1. Take off the cover of the ioLogik server

2. Plug in the LCD module

3. Instantly check and configure IP address

4. Check counter or analog value

Specifications

LCD Screen: 16 x 2 text display in English
Operating Temperature: 0 to 55°C (32 to 131°F), 5 to 95% RH
Storage Temperature: -20 to 70°C (-4 to 158°F), 5 to 95% RH

Ordering Information

LDP1602: LCD module for ioLogik 2000 lines

ioLogik 4000 Series Expandable Remote I/O Servers

Expandable Remote I/O Solutions for Data Acquisition and Control

Features

- Remotely acquire sensor data and control I/O points via Ethernet, RS-485, and RS-232
- Full range of digital and analog I/O modules
- Expandable up to 32 modules for a maximum of 512 DI/O points or 124 analog channels
- Modular package for fast swap and maintenance
- Standard Modbus/TCP/RTU/ASCII, and compatible with most SCADA software
- DLL library for easy programming

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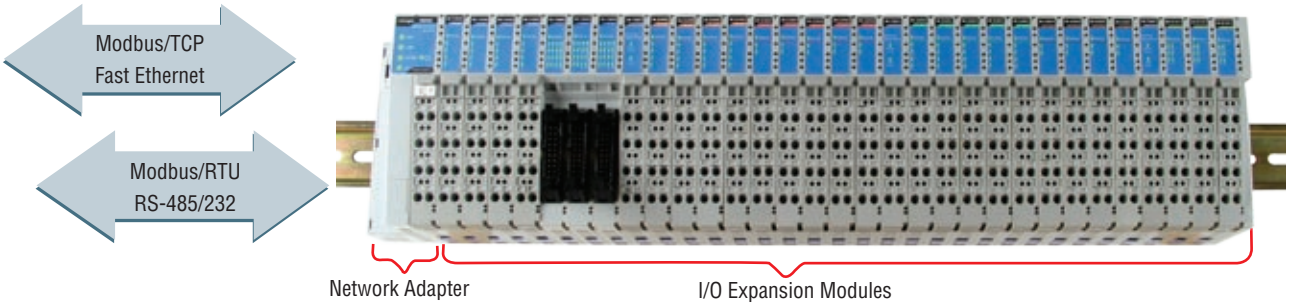
Overview

The ioLogik 4000 series of remote I/O servers is designed to read sensor data, on/off status, and to control the on/off status of devices via Ethernet or RS-485/232 remotely from a host computer or a PLC controller. Support for the standard Modbus protocol makes the ioLogik 4000 compatible with most SCADA software, such as Intellution iFix, Wonderware, and Labview.

Link the Real World and Digital World

ioLogik remote I/O products from MOXA connect a variety of sensors, and electrical, electronic, and mechanical devices—temperature, humidity, and light sensors, pressure transmitters and motors and more—to computers and applications over standard Ethernet networks and the Internet. MOXA also offers an RS-485 line of remote I/O servers that can work with existing applications. By using an NPort wireless device server, you can even connect sensors and devices via a wireless LAN network.

Expandable I/O Modules for a Full Range of I/O Combinations



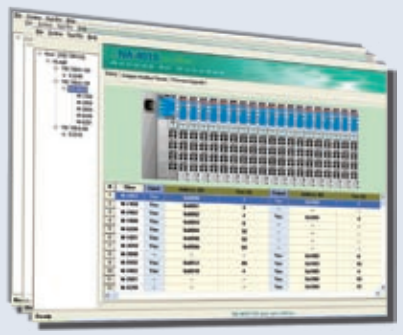
Types of Network Adapter		
Ethernet	RS-485	RS-232

I/O Module							
Digital Input		Digital Output		Analog Input		Analog Output	
Type	Channels	Type	Channels	Type	Channels	Types	Channels
24 VDC	4, 8, 16	24 VDC	4, 8, 16	0 to 20 mA	4	0 to 20 mA	2
48 VDC	4	24 VDC w/ Diag	4	4 to 20 mA	4	4 to 20 mA	2
110 VAC	4	125 VAC	2	0 to 10V	4	0 to 10V	2
230 VAC	4	230 VAC	2	+/-10V	4	+/-10V	2
				0 to 5V	4	0 to 5V	2
				RTD	2		
				TC	2		

Easy-to-Use Windows Utility

ioAdmin allows you to configure and monitor ioLogik servers remotely. ioAdmin automatically detects the installed ioLogik Ethernet I/O server and presents the installation sequence of the I/O expansion modules. ioAdmin also detects and generates a Modbus address table, which can be printed or stored on a computer for SCADA software configuration.

What You See Is What You Install !!

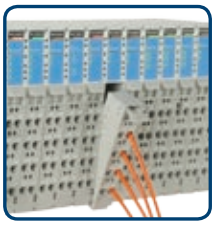


Easy Maintenance

ioLogik 4000 servers provide spring type, removable terminal blocks (RTB) that allow you to preserve field wiring before replacing any I/O expansion modules. Each I/O expansion module can be quickly and easily replaced.

Slice Type I/O Modules

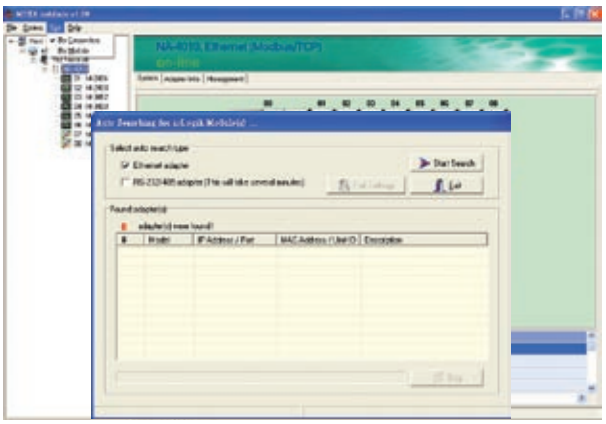
Removable Terminal Block



Spring Type Terminal Block

Module Coding Tag

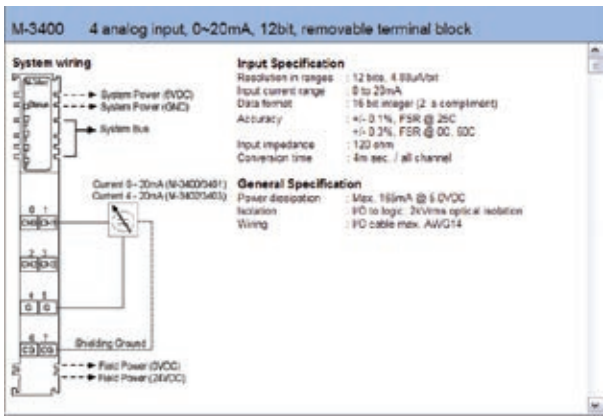
Automatic Search for Installed ioLogik Servers



ioAdmin can automatically search for installed ioLogik servers. The automatic search function supports both Ethernet and RS-232/485 searching.

Online Documentation

Traditionally, engineers needed to manually prepare a wiring handbook. ioAdmin provides convenient online documentation that engineers may use when planning or troubleshooting field wiring. The online documentation not only covers module types, but also includes a wiring guide. The search by keyword function gives engineers a more efficient means of reducing overall installation time.



Report Generation

To help you record I/O module combinations and parameters, ioAdmin can generate a report file in text format that may be used to help manage the system. There are three areas in the report. One is for slice models, another is for slice configurations, and the third is for the Modbus address table. To help you configure SCADA, you can see the combination of slices in the slice models and the Modbus address in the Modbus address table. This is particularly helpful since the Modbus address is dynamically dependent on the combination of slices.

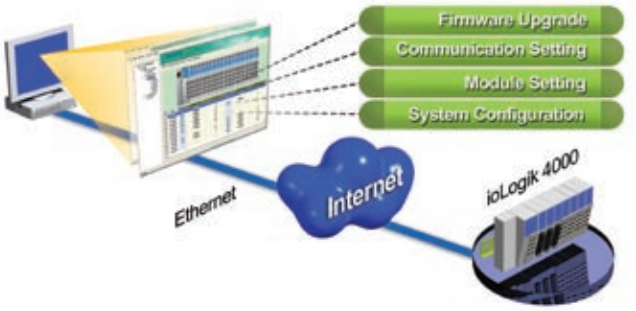
```
2. Slice configurations
-----------------------
00      NA-4010 IP=140.136.15.100,MM=255.255.255.0,GW=140.136.15.254,MAC=10-00-00-10-00-00
                Watchdog=Disable
01      M-1800  -n/a-
02      M-2402  -n/a-
02      M-2402  Ch00: Safe mode=Safe Status(OFF)
02      M-2402  Ch01: Safe mode=Safe Status(OFF)
02      M-2402  Ch02: Safe mode=Safe Status(OFF)
02      M-2402  Ch03: Safe mode=Safe Status(OFF)
03      M-4211  Ch01: Safe mode=Safe Value(0x0000)
03      M-4211  Ch02: Safe mode=Safe Value(0x0000)
04      M-3412  -n/a-
05      M-6200  Ch00: Sensor Type=PT100, Temperature Type=Celsius (°C), Filter Type=Normal
05      M-6200  Ch01: Sensor Type=PT100, Temperature Type=Celsius (°C), Filter Type=Normal

3. Modbus address table
-----------------------
Slot No.        Channel No.     I/O type        Modbus Address(WORD)    Modbus Address(BIT)     I/O Data Length(bits)
01              00              Input           0x0000/0x00             0x0000                  0x0001
01              01              Input           0x0000/0x01             0x0001                  0x0001
01              02              Input           0x0000/0x02             0x0002                  0x0001
01              03              Input           0x0000/0x03             0x0003                  0x0001
01              04              Input           0x0000/0x04             0x0004                  0x0001
```

Slice configuration

Modbus address table

Remote Configuration



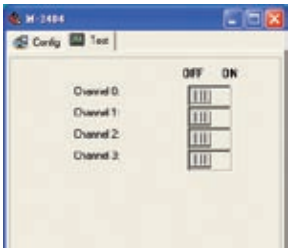
ioAdmin is a powerful, Windows-based configuration and management tool. You may use ioAdmin to modify the IP address, update communication parameters, and configure all other settings easily. In addition, ioAdmin can be used to configure ioLogik I/O servers from a remote host. This means that ioLogik servers may be configured from anywhere over the Ethernet, which may help reduce operating costs.

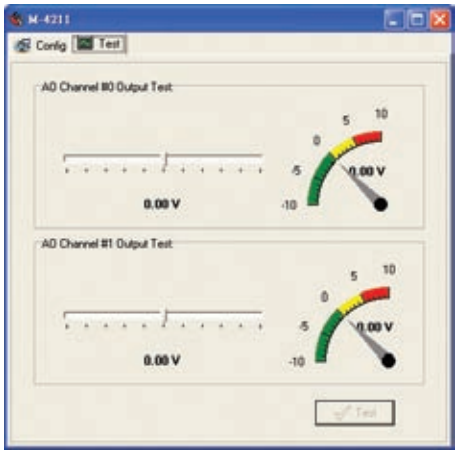
I/O Testing

ioAdmin provides a test function to verify operation of digital and analog output channels. Traditionally, users needed to use a meter to check the status of each sensor. With ioLogik servers, they may use ioAdmin's intuitive software interface to test digital and analog output channels.

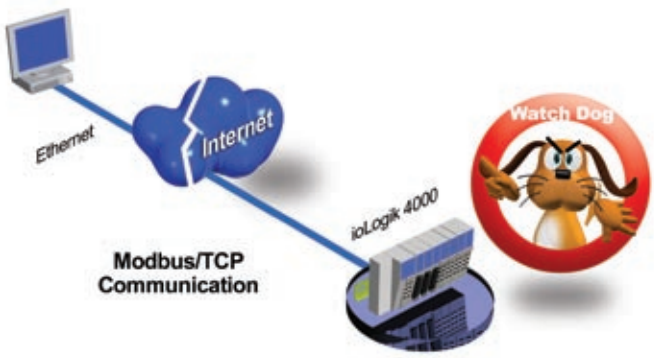
Digital output: Use the switch to test the on/off status.

Analog output: Use the slider to test the voltage output.





Safe Status with Communication Watchdog Timer



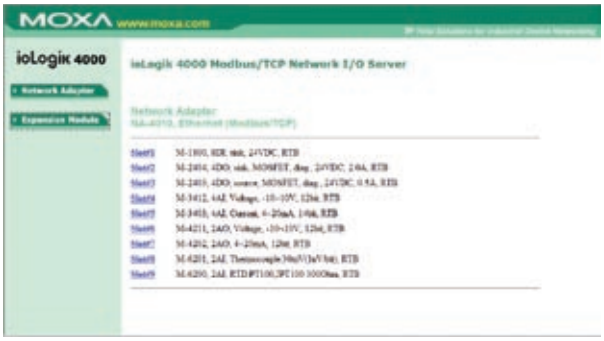
ioLogik 4000 servers are equipped with a built-in watchdog timer that monitors the Modbus communication status. If Modbus communication between the remote I/O server and a host computer or a PLC is interrupted, the watchdog can activate safe status to reset all output channels to a user-defined state. The watchdog ensures the safety of field operations if there is a problem with communication.

Digital output channels may be set to On, Off, or Hold Last Status when safe status is activated. Analog output channels may be set to Fixed Safe Value, Low Limit, or High Limit when safe status is activated. For example, if you set the safe status of a DO to "off," then the DO will automatically turn off if Modbus communication times out.

Self-Diagnostic Function for Digital Output Channels

The M-2402, 2403, 2404, and 2405 modules include a self-diagnostic function to guarantee that the digital output signal is monitored electronically. The hardware-monitored status will be written to the logic system. You will obtain the actual digital output status over the network when the software sends a command to the module. This is all done internally; configuration is not required.

Check Remote I/O Status with a Web Browser

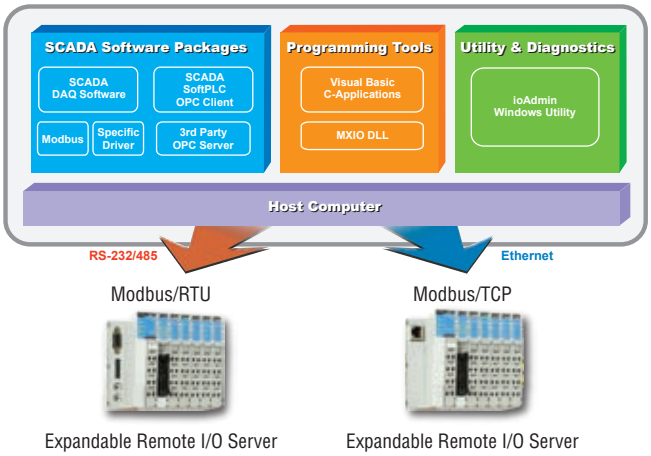


ioAdmin is the main configuration interface for ioLogik servers. However, you can also check some information using the ioLogik server's web console. The following information can be obtained using your web browser:

- Network configuration
- Expansion module
- Status of each channel

Versatile Software Support

ioLogik 4000 servers support the standard Modbus protocol and is compatible with most SCADA software. In addition, MOXA provides an easy-to-use MXIO DLL library that helps programmers develop application software with Visual Basic or C language under a Windows platform.

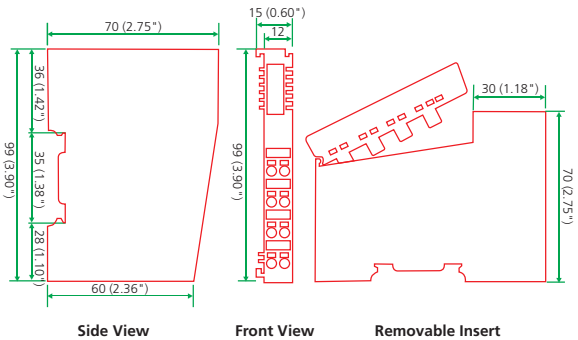


Supports Various SCADA Software Packages

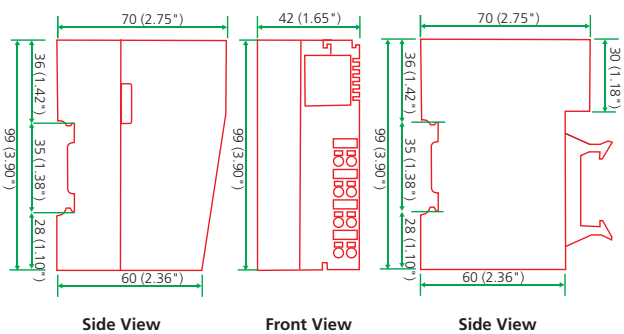
The ioLogik 4000 line was designed for the standard Modbus protocol and can be used with most SCADA systems. The following SCADA software has been found compatible with ioLogik 4000 servers: Modicon Driver, Wonderware Intouch, GE Fanuc iFix and CIMPLICITY, Broadwin,kingview, and Citect. In addition, we successfully tested OPC Server "Kepware," which means that ioLogik 4000 servers may be accessed using SCADA or OPC Server. (Note: You can download the installation guide for different SCADA software packages from MOXA's download center)

Dimensions

I/O Terminal Dimensions

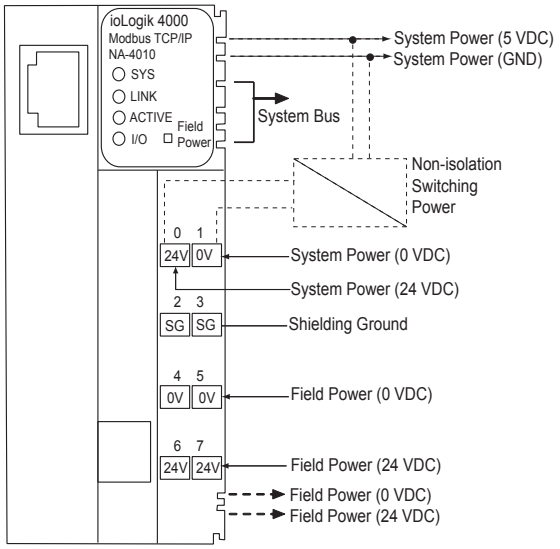


I/O Network Adaptor



Network Adapter Modules

NA-4010 Ethernet Network Adapter



Specifications

Network

Ethernet: 10/100 Mbps, RJ45

Software Features

Protocols: Modbus/TCP, HTTP, Bootp

IP settings: ARP, Bootp, static IP

Utility: ioAdmin

Programming Library: MXIO DLL library for Windows supporting Visual Basic, Visual C++, Borland C++ Builder

Max. I/O Modules: Up to 32 I/O expansion modules

System Power

Power Input: 11 to 28.8 VDC, 24 VDC typical

Power Consumption: 60 mA typical @ 24 VDC

Current for I/O Modules: Max. 1.5A @ 5 VDC

Field Power

Rated Voltage: 11 to 28.8 VDC, 24 VDC typical

Current in Field Power Contact: Max. 10A

Protection

System Power to I/O Driver: 2 KV rms optical isolation

Environment

Operating Temperature: -20 to 60°C, 5 to 90%RH

Storage Temperature: -45 to 85°C

Vibration: IEC-68-2-6, 2G in operation

Agency Approvals

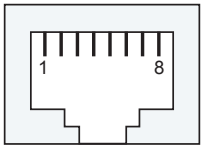
EMC: CE EN-55082, EN-55081

Safety: UL 508

Weight

Net Weight: 150 g

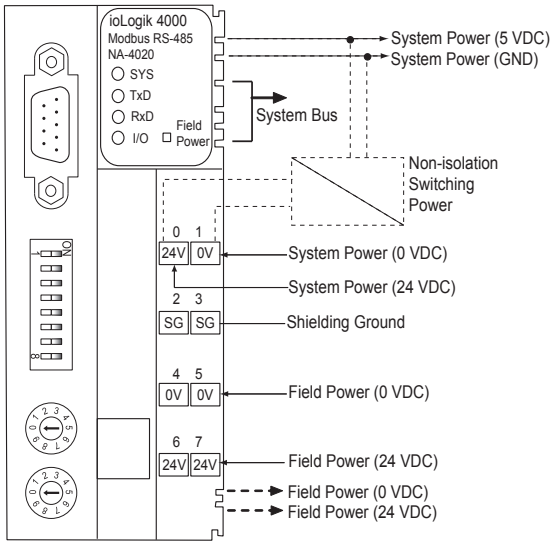
Pin Assignment



Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx-

Network Adapter Modules

NA-4020 RS-485 Network Adapter
NA-4021 RS-232 Network Adapter



Specifications

Serial Communication

Baudrate: 1200 to 115200 bps
Data Bits: 7, 8
Parity Bit: None, Even, Odd
Stop Bit: 1, 2
Signal: NA-4020: Data+, Data-, Gnd, DIR
NA-4021: TxD, RxD, Gnd

Software Features

Protocols: Modbus/RTU, Modbus/ASCII
Modbus Address: 00 to 99 by rotary switches
Utility: ioAdmin

Programming Library: MXIO DLL library for Windows supporting Visual Basic, Visual C++, Borland C++ Builder
Max. I/O Modules: Up to 32 I/O expansion modules

System Power

Power Input: 11 to 28.8 VDC, 24 VDC typical

Power Consumption: 70 mA typical @ 24 VDC
Current for I/O Modules: Max. 1.5A @ 5 VDC

Field Power

Rated Voltage: 11 to 28.8 VDC, 24 VDC typical
Current in Field Power Contact: Max. 10A

Protection

System Power to I/O Driver: 2 KV rms optical isolation

Environment

Operating Temperature: -20 to 60°C, 5 to 90%RH
Storage Temperature: -45 to 85°C
Vibration: IEC-68-2-6, 2G in operation

Agency Approvals

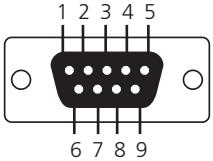
EMC: CE EN-55082, EN-55081
Safety: UL 508

Weight

Net Weight: 150 g

Pin Assignment

Female DB9 (F)



NA-4020

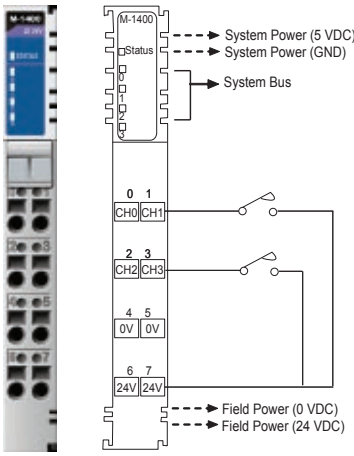
Pin	Signal
1	---
2	---
3	Data+
4	Direction (Output)
5	GND
6	---
7	---
8	Data-

NA-4021

Pin	Signal
1	---
2	TxD
3	RxD
4	---
5	GND
6	---
7	---
8	---

Digital Input Modules

4/8-channel 24/48 VDC Digital Input Modules



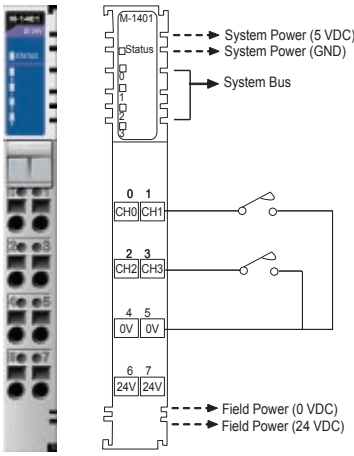
M-1400 4 digital inputs, sink, 24 VDC

Input Specifications

Inputs per Module: 4 points, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA / point @ 28.8 VDC
Input Impedance: Typ. 5.1 Kohm
Filtering Time: Typ. 1.5 ms
Common Type: 4 points/2 COM

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



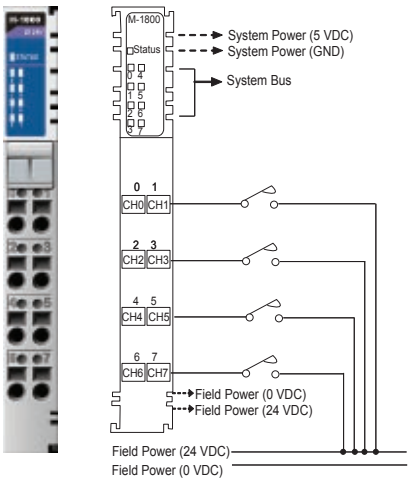
M-1401 4 digital inputs, source, 24 VDC

Input Specifications

Inputs per Module: 4 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA / point @ 28.8 VDC
Input Impedance: Typ. 5.1 Kohm
Filtering Time: Typ. 1.5 ms
Common Type: 4 points/2 COM

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



M-1800 8 digital inputs, sink, 24 VDC

Input Specifications

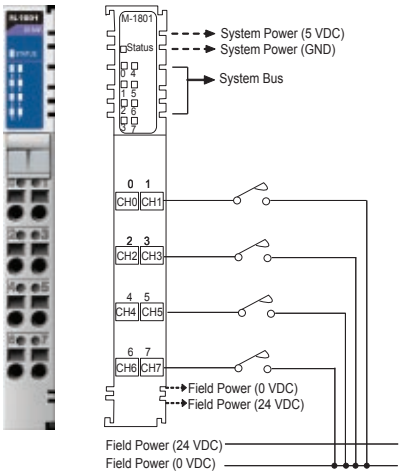
Inputs per Module: 8 points, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA / point @ 28.8 VDC
Input Impedance: Typ. 5.1 Kohm
Filtering Time: Typ. 1.5 ms
Common Type: External common

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14

Digital Input Modules

4/8-channel 24/48 VDC Digital Input Modules



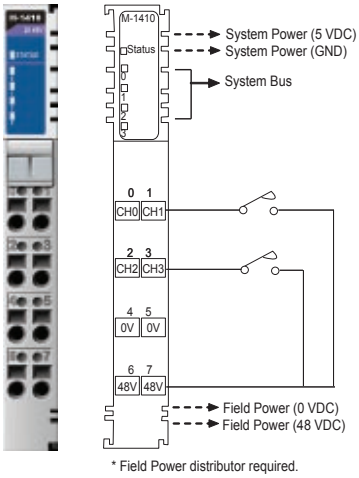
M-1801 8 digital inputs, source, 24 VDC

Input Specifications

Inputs per Module: 8 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA / point @ 28.8 VDC
Input Impedance: Typ. 5.1 Kohm
Filtering Time: Typ 1.5 ms
Common Type: External common

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



* Field Power distributor required.

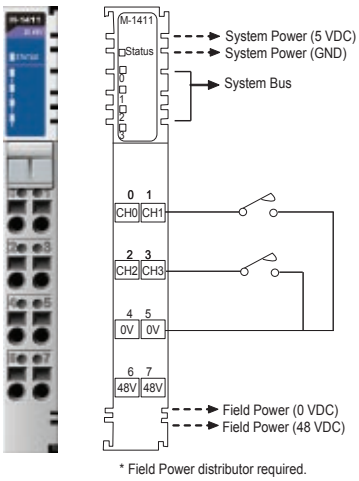
M-1410 4 digital inputs, sink, 48 VDC

Input Specifications

Inputs per Module: 4 points, sink type
On-state Voltage: 48 VDC nominal, min. 34 VDC to max. 60 VDC
Min. Off-state Voltage: Max. 10 VDC
On-state Current: Max. 4 mA / point @ 48 VDC
Input Impedance: Typ. 12 Kohm
Common Type: 4 points/2 COM

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 48 VDC nominal
Wiring: I/O cable max. AWG14



* Field Power distributor required.

M-1411 4 digital inputs, source, 48 VDC

Input Specifications

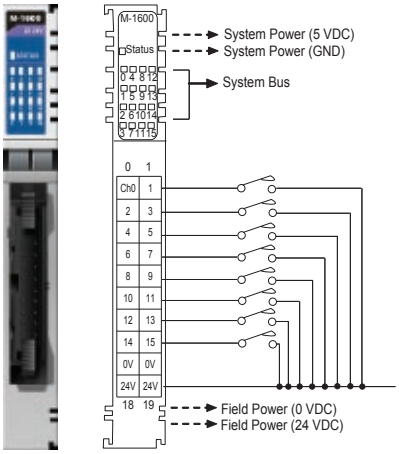
Inputs per Module: 4 points, source type
On-state Voltage: 48 VDC nominal, min. 34 VDC to max. 60 VDC
Min. Off-state Voltage: Max. 10 VDC
On-state Current: Max. 4 mA / point @ 48 VDC
Input Impedance: Typ. 12 Kohm
Common Type: 4 points/2 COM

General Specifications

Power Consumption: Max. 3 5 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 48 VDC nominal
Wiring: I/O cable max. AWG14

Digital Input Modules

16-channel 24 VDC Digital Input Modules



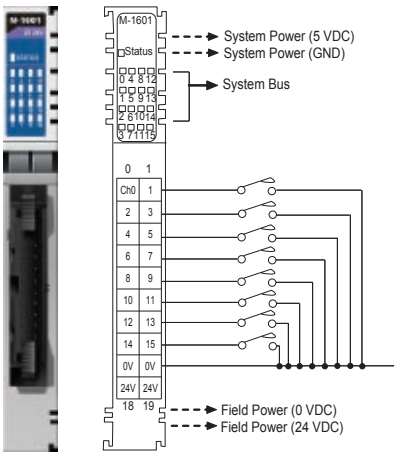
M-1600 16 digital inputs, sink, 24 VDC

Input Specifications

Inputs per Module: 16 points, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA / point @ 28.8 VDC
Input Impedance: Typ. 5.1 Kohm
Filtering Time: Typ. 1.5 ms
Common Type: 16 points/2 COM

General Specifications

Power Consumption: Max. 40 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



M-1601 16 digital inputs, source, 24 VDC

Input Specifications

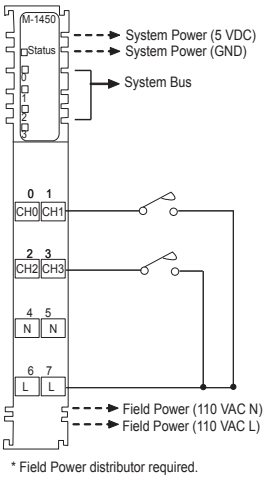
Inputs per Module: 16 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA / point @ 28.8 VDC
Input Impedance: Typ. 5.1 Kohm
Filtering Time: Typ. 1.5 ms
Common Type: 16 points/2 COM

General Specifications

Power Consumption: Max. 40 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14

Digital Input Modules

4-channel 110V/240 VAC Digital Input Modules



* Field Power distributor required.

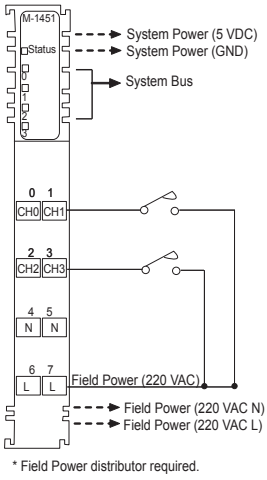
M-1450 4 digital inputs, 110 VAC

Input Specifications

Inputs per Module: 4 points
On-state Voltage: 120 VAC nominal, min. 85 VAC to max. 132 VAC
Min. Off-state Voltage: Max. 45 VAC
On-state Current: Max. 8 mA / point @ 132 VAC
Input Impedance: Typ. 11 Kohm
Common Type: 4 points/2 COM (single common)

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 110 VAC nominal
Wiring: I/O cable max. AWG14



* Field Power distributor required.

M-1451 4 digital inputs, 220 VAC

Input Specifications

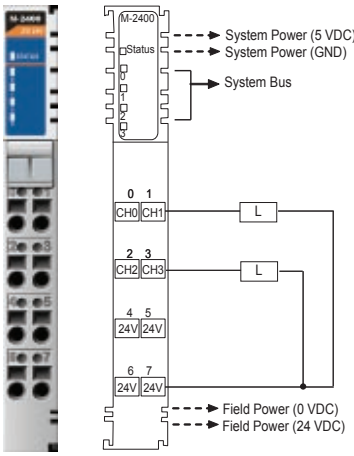
Inputs per Module: 4 points
On-state Voltage: 240 VAC nominal, min. 170 VAC to max. 264 VAC
Min. Off-state Voltage: Max. 45 VAC
On-state Current: Max. 12 mA / point @ 264 VAC
Input Impedance: Typ. 22 Kohm
Common Type: 4 points/2 COM (single common)

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 220 VAC nominal
Wiring: I/O cable max. AWG14

Digital Output Modules

4/8-channel 24 VDC Digital Output Modules



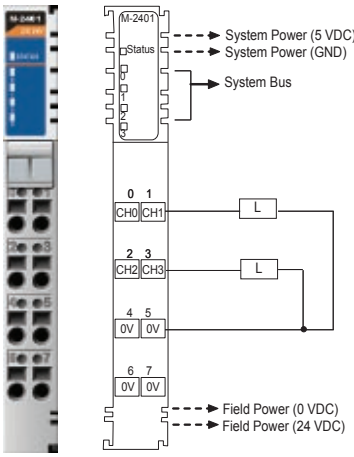
M-2400 4 digital outputs, sink, 24 VDC, 0.5A

Output Specifications

Outputs per Module: 4 points, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.5A per channel
Max. 2A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 6.5A per 1/2/4 channels
Short circuit protection: 6.5A per 4 channels
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 4 points /4 COM (single common)

General Specifications

Power consumption: Max. 45 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



M-2401 4 digital outputs, source, 24 VDC, 0.5A

Output Specifications

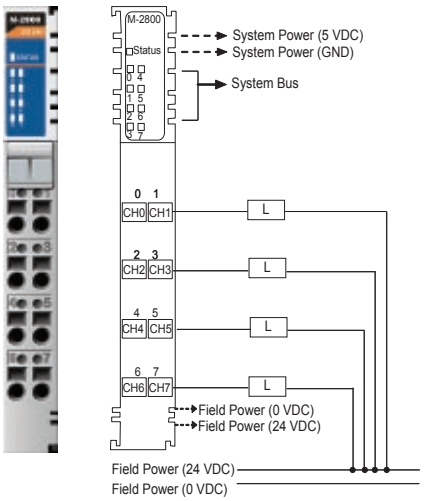
Outputs per Module: 4 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.5A per channel
Max. 2A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 6.5A per 1/2/4 channels
Short circuit protection: 6.5A per 4 channels
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 4 points/4 COM (single common)

General Specifications

Power Consumption: Max. 45 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14

Digital Output Modules

4/8-channel 24 VDC Digital Output Modules



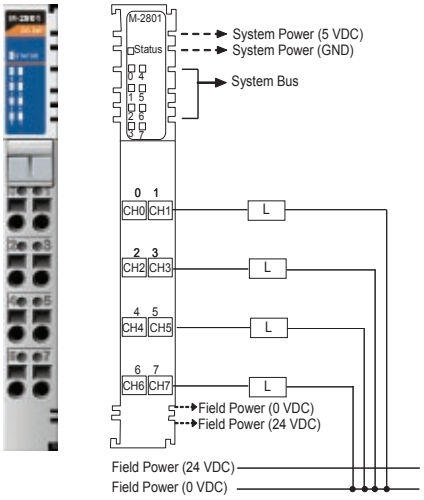
M-2800 8 digital outputs, sink, 24 VDC, 0.5A

Output Specifications

Outputs per Module: 8 points, sink type
On-state Voltage: 24 VDC nominal, min.11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.5A per channel
Max. 4A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 1.7A
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 8 points/External common (single common)

General Specifications

Power Consumption: Max. 60 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



M-2801 8 digital outputs, source, 24 VDC, 0.5A

Output Specifications

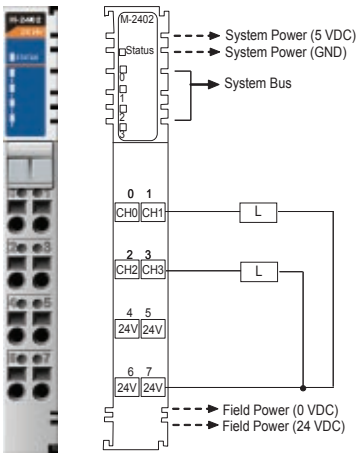
Outputs per Module: 8 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.5A per channel
Max. 4A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 1.7A
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 8 points/external common (single common)

General Specifications

Power Consumption: Max. 60 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14

Digital Output Modules

4-channel Digital Output Modules with Self-Diagnostics



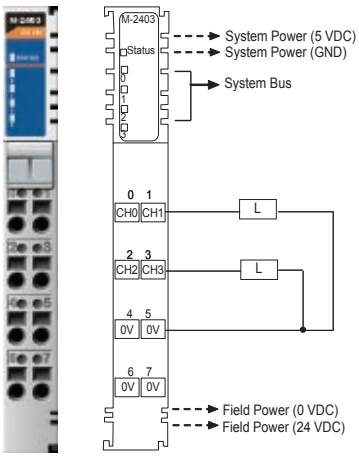
M-2402 4 digital outputs, self-diagnostics, sink, 24 VDC, 0.5A

Output Specifications

Outputs per Module: 4 points, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.5A per channel
Max. 2A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 6.5A per 1/2/4 channels
Short circuit protection: 6.5A per 4 channels
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 4 points/4 COM (single common)
Self Diagnostics: Yes

General Specifications

Power Consumption: Max. 45 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



M-2403 4 digital outputs, self-diagnostics, source, 24 VDC, 0.5A

Output Specifications

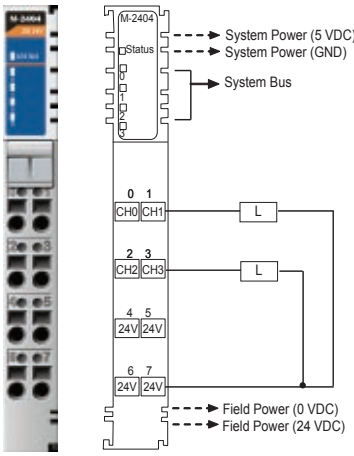
Outputs per Module: 4 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.5A per channel
Max. 2A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 6.5A per 1/2/4 channels
Short circuit protection: 6.5A per 4 channels
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 4 points /4 COM (single common)
Self Diagnostics: Yes

General Specifications

Power Consumption: Max. 45 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14

Digital Output Modules

4-channel Digital Output Modules with Self-Diagnostics



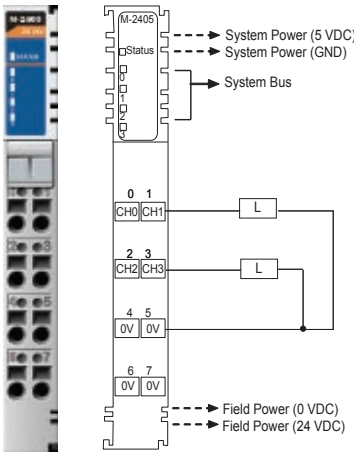
M-2404 4 digital outputs, self-diagnostics, sink, 24 VDC, 2A

Output Specifications

Outputs per Module: 4 points, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off leakage Current: Max. 50 μA
Output Current Rating: Max. 2A per channel
Max. 8A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 6.5A
Short circuit protection: 6.5A per 4 channels
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 4 points/4 COM (single common)
Self Diagnostics: Yes

General Specifications

Power Consumption: Max. 45 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14



M-2405 4 digital outputs, self-diagnostics, source, 24 VDC, 2A

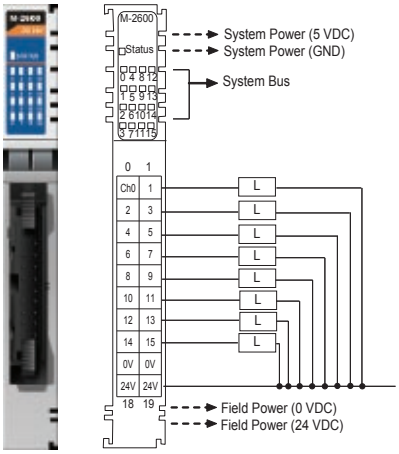
Output Specifications

Outputs per Module: 4 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 2A per channel
Max. 8A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current limit: 6.5A
Short circuit protection: 6.5A per 4 channels
ESD protection for output pin: 16.5 KV
Surge Current: 1A for 10 ms, repeatable every 3 seconds
Common Type: 4 points/4 COM (single common)
Self Diagnostics: Yes

General Specifications

Power Consumption: Max. 45 mA @ 5 VDC
Isolation: I/O to logic: 2 KV rms optical isolation
Field Power: Supply voltage: 24 VDC nominal
Wiring: I/O cable max. AWG14

16-channel Digital Output Modules



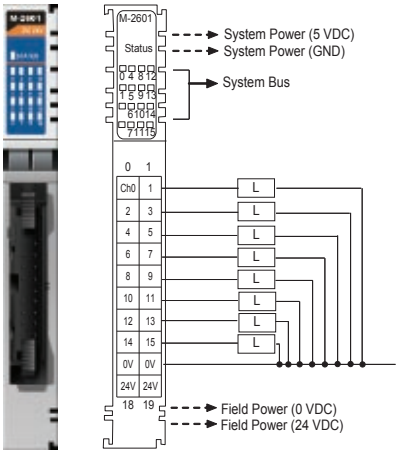
M-2600 16 digital outputs, sink, 24 VDC, 0.3A

Output Specifications

Outputs per Module: 16 points, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.3A per channel
Max. 4A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current protection: one time electrical fuse (125 VDC/6.3A)
Common Type: 16 points / 2 COM (single common)

General Specifications

Power Consumption: Max. 80 mA @ 5 VDC
Isolation: I/O to logic: optical isolation, 500 VAC/min, terminal to FG
Field Power: Supply voltage: 24 VDC nominal
Wiring: Pin header, external relay board required



M-2601 16 digital outputs, source, 24 VDC, 0.3A

Output Specifications

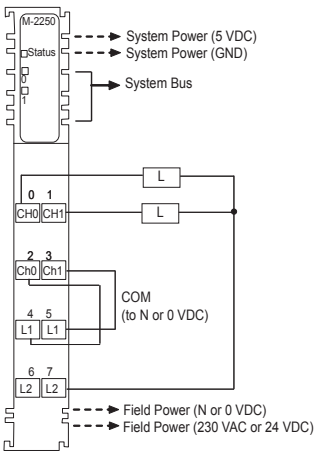
Outputs per Module: 16 points, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Operating Frequency: 50 Khz on DC power
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating: Max. 0.3A per channel
Max. 4A per common
Protection: Over temperature shutdown: Typ. 175°C
Over current protection: one time electrical fuse (125 VDC/6.3A)
Common Type: 16 points / 2 COM (single common)

General Specifications

Power Consumption: Max. 80 mA @ 5 VDC
Isolation: I/O to logic: optical isolation, 500 VAC/min, terminal to FG
Field Power: Supply voltage: 24 VDC nominal
Wiring: Pin header, external relay board required

Digital Output Modules

2-channel Relay Output Module



* Field Power distributor required when the field power is not 24 VDC.

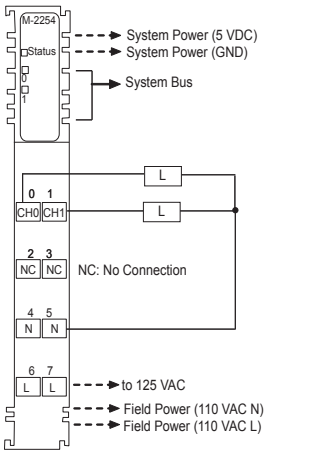
M-2250 2 digital outputs, relay, 24 VDC/230 VAC, 2A

Output Specifications

Outputs per Module: 2 points, relay
Relay Type: Form A, Normally Open (N.O.)
Single pole, single throw (SPST)
Output Voltage Range: Load dependent
5 to 28.8 VDC @ 2A resistive
48 VDC @ 0.8A resistive
110 VAC @ 0.3A resistive
250 VAC @ 2A resistive
Output Current Rating: At rated power
2A @ 5 to 28.8 VDC
0.8A @ 48 VDC
0.5A @ 110 VAC
2A @ 250 VAC
Min. Load: 100 µA, 100 m VDC per point
Max. On-state Voltage Drop: 0.5V @ 2A, resistive load, 24 VDC
Off-state Leakage Current: Max. 1.5 mA
Common Type: 1 point/1 COM

General Specifications

Power Consumption: Max. 65 mA @ 5 VDC
Wiring: I/O cable max. AWG14



* Field Power distributor required when the field power is not 24 VDC.

M-2254 2 digital outputs, Triac, 12 to 125 VAC, 0.5A

Output Specifications

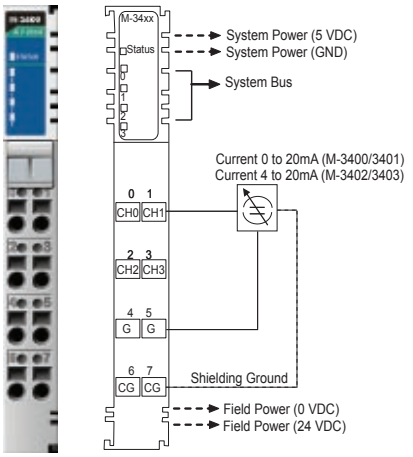
Outputs per Module: 2 points
Switch Type: Zero crossing
Rated Load Voltage: 15 to 132 VAC
Output Current Rating: 0.05 to 0.5A
Frequency Range: 47 to 63 Hz
Surge Current: 40A (16 ms) /4A (30S)
On-state Voltage Drop: 1.3 Vrms (max. load)
Off-state Leakage Current: Max. 1.5 mA
Common Type: 2 points / 2 COM

General Specifications

Power Consumption: Max. 35 mA @ 5 VDC
Wiring: I/O cable max. AWG14

Analog Input Modules

General Resolution



M-3400 4 analog inputs, 0 to 20 mA, 12-bit
M-3402 4 analog inputs, 4 to 20 mA, 12-bit

Input Specifications

Resolution in Ranges: 12 bits, 4.88 μA/bit (M-3400)
12 bits, 3.91 μA/bit (M-3402)
Input Current Range: 0 to 20 mA (M-3400)
4 to 20 mA (M-3402)
Data Format: 16-bit integer (2's complement)
Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C
Input Impedance: 120 ohm
Conversion Time: 4 ms / all channels

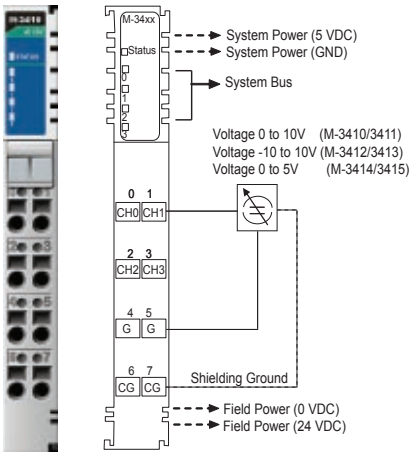
General Specifications

Power Consumption: Max. 150 mA @ 5 VDC
Isolation: I/O to logic: 1K VDC galvanic isolation
Wiring: I/O cable max. AWG14
Conversion Table (M-3400)

Current	0 mA	5 mA	10 mA	20 mA
Data (Hex)	H0000	H03FF	H07FF	H0FFF

Conversion Table (M-3402)

Current	4 mA	5 mA	10 mA	20 mA
Data (Hex)	H0000	H00FF	H05FF	H0FFF



M-3410 4 analog inputs, 0 to 10V, 12-bit
M-3412 4 analog inputs, -10 to 10V, 12-bit
M-3414 4 analog inputs, 0 to 5V, 12-bit

Input Specifications

Resolution in Ranges: 12 bits, 2.44 mV/bit (M-3410)
12 bits, 4.88 mV/bit (M-3412)
12 bits, 1.22 mV/bit (M-3414)
Input Current Range: 0 to 10 VDC (M-3410)
-10 to 10 VDC (M-3412)
0 to 5 VDC (M-3414)
Data Format: 16-bit integer (2's complement)
Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C
Input Impedance: 500 Kohm
Conversion Time: 4 ms / all channels

General Specifications

Power Consumption: Max. 150 mA @ 5 VDC
Isolation: I/O to logic: 1K VDC galvanic isolation
Wiring: I/O cable max. AWG14
Conversion Table (M-3410)

Voltage	0V	2V	5V	10V
Data (Hex)	H0000	H0333	H07FF	H0FFF

Conversion Table (M-3412)

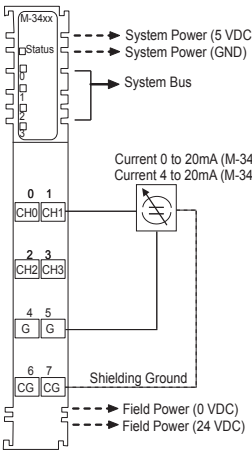
Voltage	-10V	-5V	0V	5V	10V
Data (Hex)	HF800	HFC00	H0000	H3FFF	H07FF

Conversion Table (M-3414)

Voltage	0V	2V	4V	5V
Data (Hex)	H0000	H0666	H0CCC	H0FFF

Analog Input Modules

High Resolution



M-3401 4 analog inputs, 0 to 20 mA, 14-bit
M-3403 4 analog inputs, 4 to 20 mA, 14-bit

Input Specifications

Resolution in Ranges: 14 bits, 1.22 μA/bit (M-3401)
14 bits, 0.98 μA/bit (M-3403)
Input Current Range: 0 to 20 mA (M-3401)
4-20 mA (M-3403)
Data Format: 16-bit integer (2's complement)
Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C
Input Impedance: 120 ohm
Conversion Time: 4 msec. / all channels

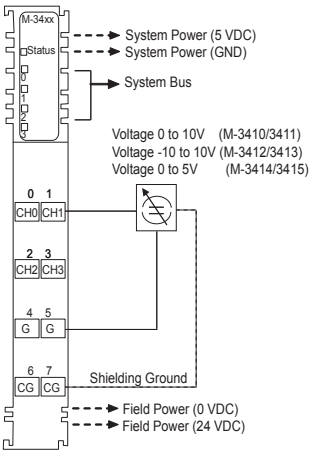
General Specifications

Power Consumption: Max. 150 mA @ 5 VDC
Isolation: I/O to logic: 1K VDC galvanic isolation
Wiring: I/O cable max. AWG14
Conversion Table (M-3401)

Current	0 mA	5 mA	10 mA	20 mA
Data (Hex)	H0000	H0FFF	H1FFF	H3FFF

Conversion Table (M-3403)

Current	4 mA	5 mA	10 mA	20 mA
Data (Hex)	H0000	H03FF	H17FF	H3FFF



M-3411 4 analog inputs, 0 to 10V, 14-bit
M-3413 4 analog inputs, -10 to 10V, 14-bit
M-3415 4 analog inputs, 0 to 5V, 14-bit

Input Specifications

Resolution in Ranges: 14 bits, 0.61 mV/bit (M-3411)
14 bits, 1.22 mV/bit (M-3413)
14 bits, 0.31 mV/bit (M-3415)
Input Current Range: 0 to 10 VDC (M-3411)
-10 to 10 VDC (M-3413)
0 to 5 VDC (M-3415)
Data Format: 16-bit integer (2's complement)
Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C
Input Impedance: 500K ohm
Conversion Time: 4 ms / all channels

General Specifications

Power Consumption: Max. 150 mA @ 5 VDC
Isolation: I/O to logic: 1K VDC galvanic isolation
Wiring: I/O cable max. AWG14
Conversion Table (M-3411)

Voltage	0V	2V	5V	10V
Data (Hex)	H0000	H0CCC	H1FFF	H3FFF

Conversion Table (M-3413)

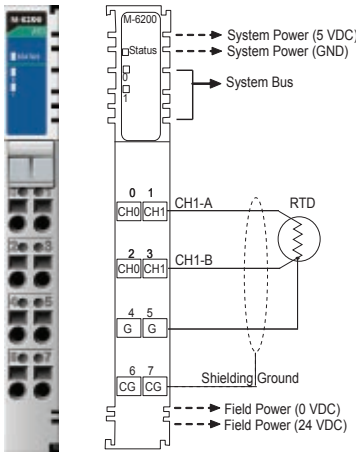
Voltage	-10V	-5V	0V	5V	10V
Data (Hex)	HE000	HF000	H0000	H0FFF	H1FFF

Conversion Table (M-3415)

Voltage	0V	2V	4V	5V
Data (Hex)	H0000	H1999	H3332	H3FFF

Analog Input Modules

Temperature Sensing



M-6200 2 analog inputs, RTD: PT100, JPT100

Input Specifications

Sensor Types: PT50, PT100, PT200, PT500, PT1000,
JPT100, JPT200, JPT500, JPT1000,
NI100, NI200, NI500, NI1000, NI120, CU10,
Resistance 100 mohm/bit,
Resistance 10 mohm/bit,
Resistance 20 mohm/bit

Data Format: 16-bit integer (2's complement)

Resolution: 0.1°C / 10 mohm

Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C

Input Impedance: 500 Kohm

Conversion Time: 200 ms / all channels

Diagnostics: Range over (if range over, data=Dx8000)

General Specifications

Power Consumption: Max. 80 mA @ 5VDC

Isolation: I/O to logic: 1K VDC galvanic isolation

Wiring: I/O cable max. AWG14

Conversion Table

Sensor PT100

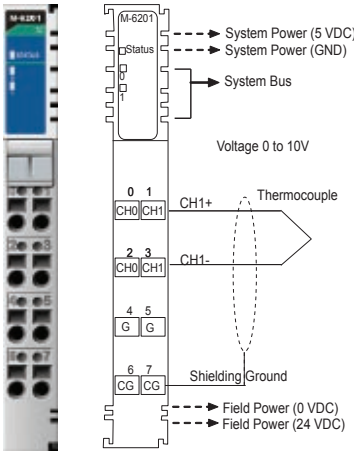
Temp.	-200 °C	-100 °C	0 °C	200°C	400°C	640°C
Data (Hex)	HF830	HFC18	H0000	H07D0	H0FA0	H1900

Other Sensor Type Data

Sensor Type	Degree	Count	Resolution
Resistance 100 mOhm	1 to 2000 Ohm	10 to 20000	100 mOhm / 1 count
Resistance 10 mOhm	1 to 327 Ohm	10 to 3270	10 mOhm / 1 count
Resistance 20 mOhm	1 to 620 Ohm	10 to 6200	20 mOhm / 1 count
PT50, 0.00385	200 to 850°C	-2000 to 8500	0.1°C or 0.1°F/ 1 count
PT100, 0.00385	-200 to 850°C	-2000 to 8500	0.1°C or 0.1°F/ 1 count
PT200, 0.00386	-200 to 850°C	-2000 to 8500	0.1°C or 0.1°F/ 1 count
PT500, 0.00385	-200 to 850°C	-2000 to 8500	0.1°C or 0.1°F/ 1 count
PT1000, 0.00385	-200 to 350°C	-2000 to 3500	0.1°C or 0.1°F/ 1 count
JPT100, 0.003916	-200 to 640°C	-2000 to 6400	0.1°C or 0.1°F/ 1 count
JPT200, 0.003916	-200 to 640°C	-2000 to 6400	0.1°C or 0.1°F/ 1 count
JPT500, 0.003916	-200 to 640°C	-2000 to 6400	0.1°C or 0.1°F/ 1 count
JPT1000, 0.003916	-200 to 350°C	-2000 to 3500	0.1°C or 0.1°F/ 1 count
NI100, 0.00618	-60 to 250°C	-600 to 2500	0.1°C or 0.1°F/ 1 count
NI120, 0.00672	-80 to 250°C	-800 to 2500	0.1°C or 0.1°F/ 1 count
NI200, 0.00618	-60 to 250°C	-600 to 2500	0.1°C or 0.1°F/ 1 count
NI500, 0.00618	-60 to 250°C	-600 to 2500	0.1°C or 0.1°F/ 1 count
NI1000, 0.00618	-60 to 180°C	-600 to 2500	0.1°C or 0.1°F/ 1 count
CU10, 0.00427	-200 to 260°C	-2000 to 2600	0.1°C or 0.1°F/ 1 count

Analog Input Modules

Temperature Sensing



M-6201 2 analog inputs, thermocouple

Input Specifications

Sensor Types: Type J/K/T/E/R/S/B/N/L/U/C/D
mV input 10 μV/bit, 2 μV/bit
Data Format: 16-bit integer (2's compliment)
Resolution: 0.1°C / 10 mohm
Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C
Input Impedance: 500 Kohm
Conversion time: 200 ms / all channels
Diagnostics: Range over (if range over, data=Dx8000)

General Specifications

Power Consumption: Max. 80 mA @ 5 VDC
Isolation: I/O to logic: 1K VDC galvanic isolation
Wiring: I/O cable max. AWG14

Conversion Table

Type B

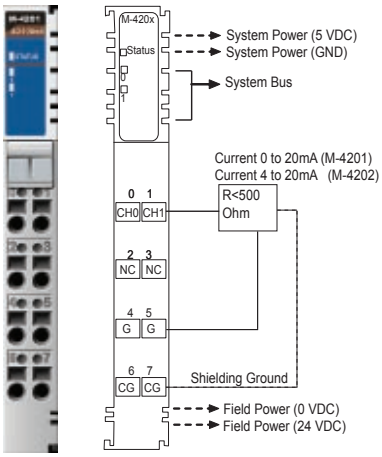
Temp.	0 °C	300°C	900 °C	1800°C
Data (Hex)	H0000	H0BB8	H2328	H4650

Other Sensor Type Data

Sensor Type	Degree	Count	Resolution
K	-200 to 12000°C	-6 to 54 mV	0.1°C,°F/bit
J	-40 to 11000°C	-8 to 69 mV	0.1°C,°F/bit
T	-200 to 350°C	-6 to 20 mV	0.1°C,°F/bit
B	600 to 1700°C	0 to 13 mV	0.1°C,°F/bit
R	0 to 1600°C	0 to 21 mV	0.1°C,°F/bit
S	0 to 1600°C	0 to 18 mV	0.1°C,°F/bit
E	-200 to 800°C	-9 to 76 mV	0.1°C,°F/bit
N	-200 to 1250°C	-4 to 47 mV	0.1°C,°F/bit
L	-150 to 850°C	-8 to 53 mV	0.1°C,°F/bit
U	-150 to 550°C	-5 to 34 mV	0.1°C,°F/bit
C	100 to 2200°C	0 to 37 mV	0.1°C,°F/bit
D	100 to 2300°C	0 to 41 mV	0.1°C,°F/bit
Voltage 10 μV/bit			10 μV/bit
Voltage 1 μV/bit			1 μV/bit
Voltage 2 μV/bit			2 μV/bit

Analog Output Modules

General Resolution



M-4201 2 analog outputs, 0 to 20 mA, 12-bit
M-4202 2 analog outputs, 4 to 20 mA, 12-bit

Output Specifications

Resolution in Ranges: 12 bits, 4.88 μA/bit (M-4201)
12 bits, 3.91 μA/bit (M-4202)
Output Current Range: 0 to 20 mA (M-4201)
4 to 20 mA (M-4202)
Data Format: 16-bit integer (2's complement)
Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C
Output Impedance: Max. 500 ohm
Conversion Time: 2 ms / all channels

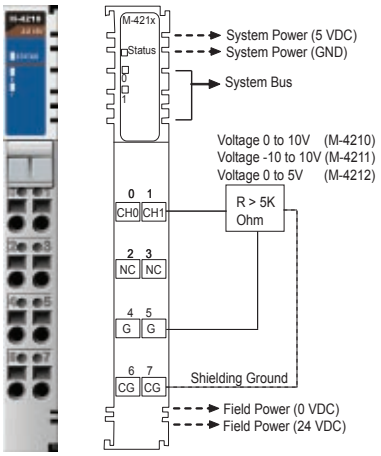
General Specifications

Power Consumption: Max. 65 mA @ 5 VDC
Isolation: I/O to logic: 1K VDC galvanic isolation
Wiring: I/O cable max. AWG14
Conversion Table (M-4201)

Current	0 mA	5 mA	10 mA	20 mA
Data (Hex)	H0000	H03FF	H07FF	H0FFF

Conversion Table (M-4202)

Current	4 mA	5 mA	10 mA	20 mA
Data (Hex)	H0000	H00FF	H05FF	H0FFF



M-4210 2 analog outputs, 0 to 10V, 12-bit
M-4211 2 analog outputs, -10 to 10V, 12-bit
M-4212 2 analog outputs, 0 to 5V, 12-bit

Input Specifications

Resolution in Ranges: 12 bits, 2.44 mV/bit (M-4210)
12 bits, 4.88 mV/bit (M-4211)
12 bits, 1.22 mV/bit (M-4212)
Output Current Range: 0 to 10 VDC (M-4210)
-10 to 10 VDC (M-4211)
0 to 5 VDC (M-4212)
Data Format: 16-bit integer (2's complement)
Accuracy: +/- 0.1%, FSR @ 25°C
+/- 0.3%, FSR @ 0°C, 60°C
Output Impedance: Min. 5 Kohm
Conversion Time: 2 ms / all channel

General Specifications

Power Consumption: Max. 200 mA @ 5 VDC
Isolation: I/O to logic: 1K VDC galvanic isolation
Wiring: I/O cable max. AWG14
Conversion Table (M-4210)

Voltage	0V	2V	5V	10V
Data (Hex)	H0000	H0333	H07FF	H0FFF

Conversion Table (M-4211)

Voltage	-10V	-5V	0V	5V	10V
Data (Hex)	HF800	HFC00	H0000	H3FFF	H07FF

Conversion Table (M-4212)

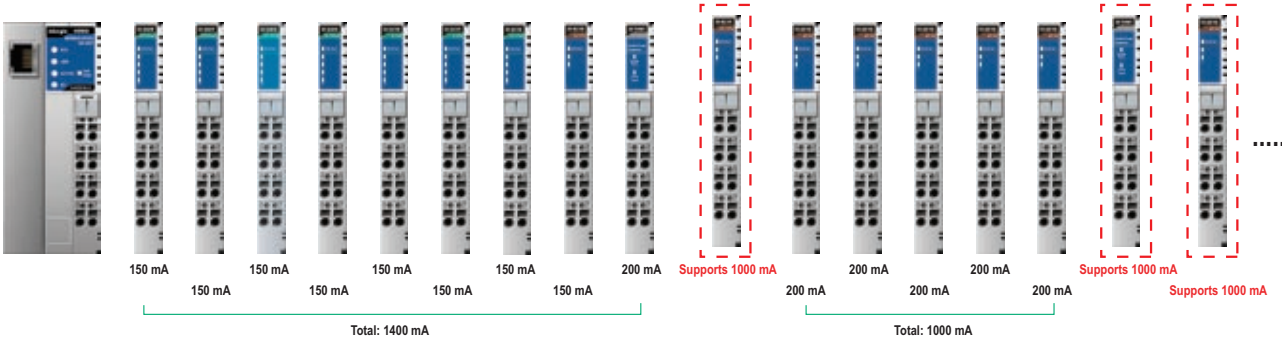
Voltage	0V	2V	4V	5V
Data (Hex)	H0000	H0666	H0CCC	H0FFF

System Modules

When to Use a System Module

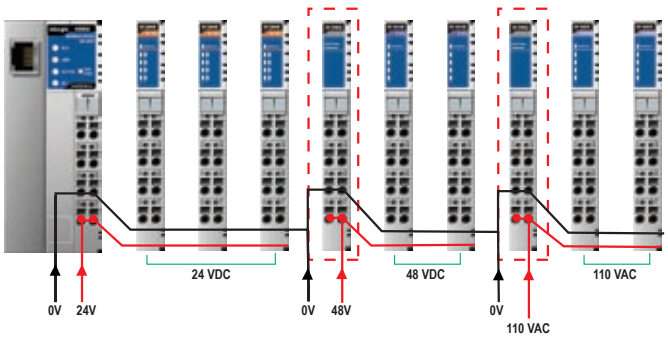
Power expansion module

The system power expansion module is designed to provide extra power for connected I/O expansion modules. Each network adapter can provide 1.5 Amp/5 VDC. If you require more power for your installed I/O expansion modules, you will need to use an M-7001 module. However, please note that the M-7001 can only provide 1 Amp per 5 VDC.



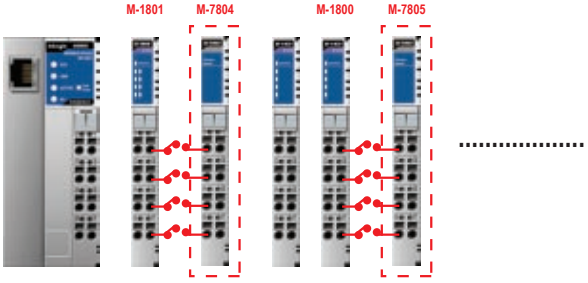
Field Power Distributor Module

The field power distributor is designed to isolate different field voltages. For example, before you connect a 48 VDC or 110 VAC DI/O module to a 24 VDC DI/O module, you will need an M-7002 field power distributor.



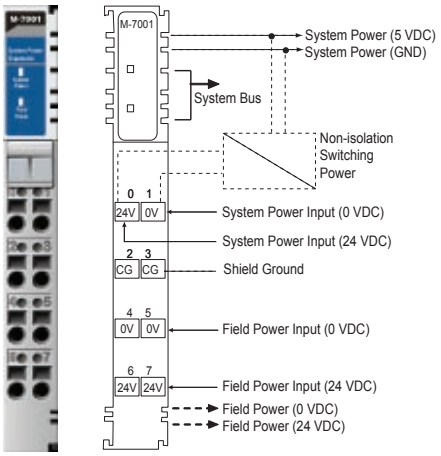
Potential Distributor Module

There are three types of potential distributor modules that provide extra wiring points, such as shielding ground, 0V field power, and 24V field power. For example, the 8-channel digital input (sink type) module by itself does not have a 24V wiring point. You may add an M-7805 for easier wiring.



System Modules

System Power Module



M-7001 System power expansion, 1.0A / 5 VDC

Input Specifications

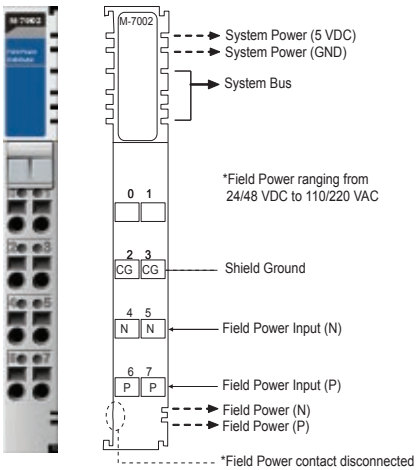
System Input Voltage Range: 11 to 28.8 VDC
System Power Input Voltage: Nominal 24 VDC
Field Power Input Voltage: Nominal 24 VDC (+/-20%)

Output Specifications

System Bus Output Voltage: Max. 5 VDC
Field Power Contacts Current: Max. 10A
Wiring: I/O cable max. AWG14

The system power expansion module is designed to provide extra power for connected I/O expansion modules.

If the power requirements of all installed I/O expansion module exceeds 1.5 Amp/5 VDC, you will need to use an M-7001 module.



M-7002 Field power distributor

Input Specifications

Field Power Voltage: 5 VDC, 24 VDC, 48 VDC, 110 VAC, 220 VAC

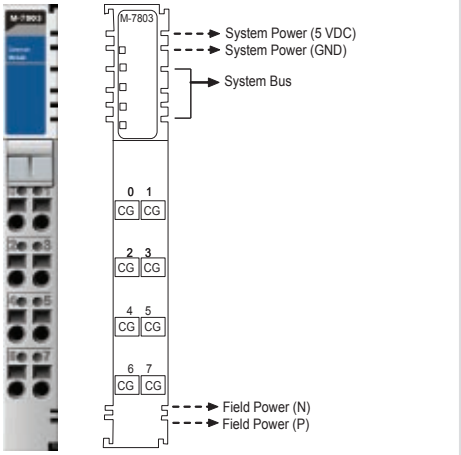
Output Specifications

Field Power Contacts Current: Max. 10A
Wiring: I/O cable max. AWG14

The field power distributor is designed to isolate different field voltages. For example, before you connect a 48 VDC or 110 VAC DI/O module to a 24 VDC DI/O module, you will need an M-7002 field power distributor.

System Modules

System Power Module



M-7803 Potential distributor, 8-ch, shield signal

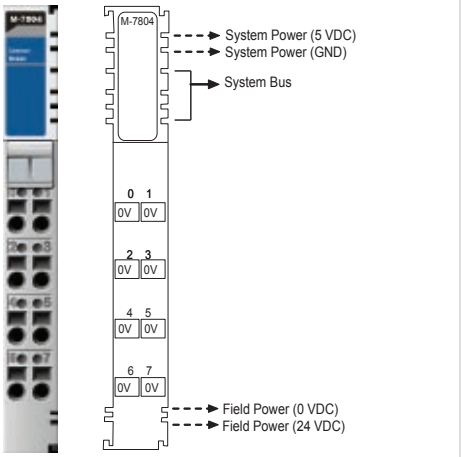
Input Specifications

Field Power Voltage: Shield signal

Output Specifications

Field Power Contacts Current: Max. 10A

Wiring: I/O cable max. AWG14



M-7804 Potential distributor, 8-ch, 0 VDC

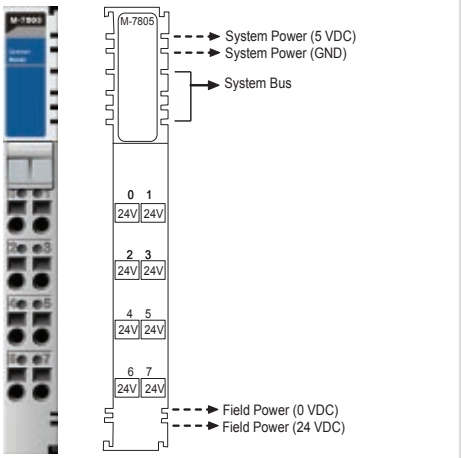
Input Specifications

Field Power Voltage: 0 VDC

Output Specifications

Field Power Contacts Current: Max. 10A

Wiring: I/O cable max. AWG14



M-7805 Potential distributor, 8-ch, 24 VDC

Input Specifications

Field Power Voltage: 24 VDC

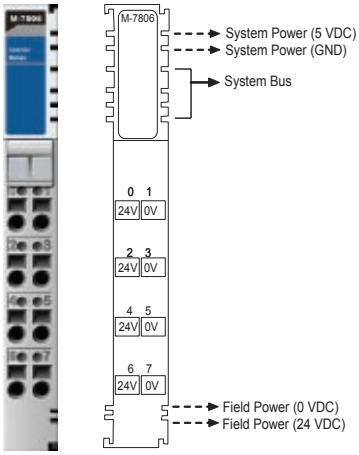
Output Specifications

Field Power Contacts Current: Max. 10A

Wiring: I/O cable max. AWG14

System Modules

System Power Module



M-7806 Potential distributor, 4-ch/24 VDC, 4-ch/0 VDC

Input Specifications

Field Power Voltage: 24 VDC/0 VDC

Output Specifications

Field Power Contacts Current: Max. 10A

Wiring: I/O cable max. AWG14

General Specifications

Environmental Specifications	
Operating Temperature	-20 to 60°C (discrete I/O) 0 to 60°C (analog I/O)
Non-Operating Temperature	-40 to 85°C
Relative Humidity	5 to 90% non-condensing
Operating Altitude	2,000 m
Mounting	DIN-rail
General Specifications	
Wiring I/O Cable	I/O cable max. 2.0m2 (AWG 14)
Shock (Operating)	2G
Shock (Non-Operating)	30G
Protect. Class	IP20
Product Certifications	UL 508, CE
Isolation	DC module (Includes analog module): terminal block to F.G 500 VAC/1 min AC module: terminal block to F.G 1500 VAC/1 min Relay module: terminal block to F.G 2500 VAC/1 min
Gross Weight	Network adapter: 180g I/O modules: 70g
Waranty	2 years

Ordering Information

Model No.	Network Adapter
NA-4010	Ethernet network adapter Modbus/TCP
NA-4020	RS-485 network adapter Modbus/RTU
NA-4021	RS-232 network adapter Modbus/RTU
Model No.	**Digital Input**
M-1400	4 DI, sink, 24 VDC, RTB
M-1401	4 DI, source, 24 VDC, RTB
M-1410	4 DI, sink, 48 VDC, RTB
M-1411	4 DI, source, 48 VDC, RTB
M-1800	8 DI, sink, 24 VDC, RTB
M-1801	8 DI, source, 24 VDC, RTB
M-1600	16 DI, sink, 24 VDC, 20-pin
M-1601	16 DI, source, 24 VDC, 20-pin
M-1450	4 DI, 110 VAC, RTB
M-1451	4 DI, 220 VAC, RTB
Model No.	**Digital Output**
M-2400	4 DO, sink, MOSFET, 24 VDC, 0.5A, RTB
M-2401	4 DO, source, MOSFET, 24 VDC, 0.5A, RTB
M-2800	8 DO, sink, MOSFET, 24 VDC, 0.5A, RTB
M-2801	8 DO, source, MOSFET, 24 VDC, 0.5A, RTB
M-2600	16 DO, sink, MOSFET, 24 VDC, 0.3A, 20-pin
M-2601	16 DO, source, MOSFET, 24 VDC, 0.3A, 20-pin
M-2402	4 DO, sink, MOSFET, self-diagnostics, 24 VDC, 0.5A, RTB
M-2403	4 DO, source, MOSFET, self-diagnostics, 24 VDC, 0.5A, RTB
M-2404	4 DO, sink, MOSFET, self-diagnostics, 24 VDC, 2.0A, RTB
M-2405	4 DO, source, MOSFET, self-diagnostics, 24 VDC, 2.0A, RTB
M-2250	2 DO, relay, 230 VAC, 24 VDC, 2.0A, RTB
M-2254	2 DO, triac, 12 to 125 VAC, 0.5A, RTB

*RTB: Removable Terminal Block
*20-pin: 20-pin header

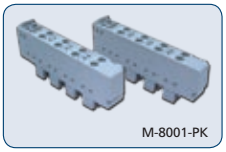
Model No.	Analog Input
M-3400	4 AI, current, 0 to 20 mA, single-ended, 12-bit, RTB
M-3402	4 AI, current, 4 to 20 mA, single-ended, 12-bit, RTB
M-3410	4 AI, voltage, 0 to 10V, single-ended, 12-bit, RTB
M-3412	4 AI, voltage, -10 to 10V, single-ended, 12-bit, RTB
M-3414	4 AI, voltage, 0 to 5V, single-ended, 12-bit, RTB
M-3401	4 AI, current, 0 to 20 mA, single-ended, 14-bit, RTB
M-3403	4 AI, current, 4 to 20 mA, single-ended, 14-bit, RTB
M-3411	4 AI, voltage, 0 to 10V, single-ended, 14-bit, RTB
M-3413	4 AI, voltage, -10 to 10V, single-ended, 14-bit, RTB
M-3415	4 AI, voltage, 0 to 5V, single-ended, 14-bit, RTB
M-6200	2 AI, RTD, PT100, JPT100, RTB
M-6201	2 AI, thermocouple: 30 mV (1V/bit), RTB
Model No.	**Analog Output**
M-4201	2 AO, current, 0 to 20 mA, 12-bit, RTB
M-4202	2 AO, current, 4 to 20 mA, 12-bit, RTB
M-4210	2 AO, voltage, 0 to 10V, 12-bit, RTB
M-4211	2 AO, voltage, -10 to 10V, 12-bit, RTB
M-4212	2 AO, voltage, 0 to 5V, 12-bit, RTB
Model No.	**System Modules**
M-7001	System expansion power supply, 1.0A (5 VDC)
M-7002	Field power distributor, 10A (24/48 VDC, 110/220 VAC)
M-7803	Potential distributor, 8-ch, shield signal
M-7804	Potential distributor, 8-ch, 0 VDC
M-7805	Potential distributor, 8-ch, 24 VDC
M-7806	Potential distributor, 4-ch/24 VDC, 4-ch/0 VDC, potential

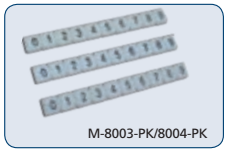
Accessories

TB 1600 (20Pin)

DIN-rail mounting screw terminal module with 20-pin connector	
Product Specifications	• 20 pins one-to-one assignment • Selectable flat cable • Connector pitch: 3.81mm • Cable length: 50cm • DIN rail mounting type • Case dimensions • (W x L x H):77.5 x 67.5 x 51 mm • RoHs compliant
Optional	• 50cm length flat cable

Ordering Information

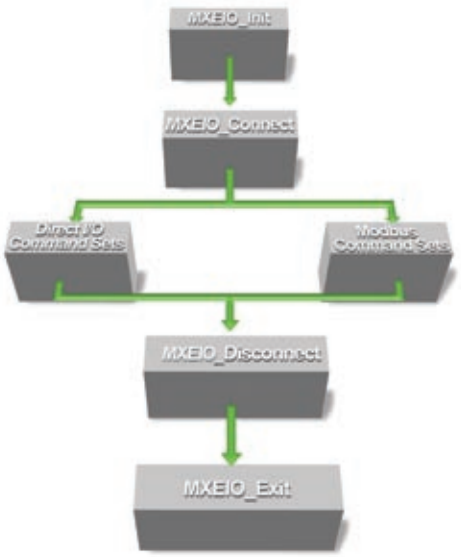




Model No.	System Modules
M-8001-PK	Removable terminal block, 9 pcs per pack
M-8003-PK	Marker with 0-9 numbering, color, 100 pcs
M-8004-PK	Blank marker, 100 pcs

MXIO DLL Library

Quick Programming—Only 5 Steps to Touch the Real World



For small-scale data acquisition systems, you may consider developing your own application in-house, rather than using an expensive SCADA package. MOXA provides a powerful MXIO library for different programming languages, including Visual Basic, Visual C++, and Borland C++ Builder, so you can build your application quickly. You can retrieve data in your application by using MXIO commands designed for the traditional Modbus protocol. Direct I/O command sets are also available for slot and channel-based commands. The MXIO library supports different platforms, including Windows 2000, Windows XP, Windows 2003, Windows CE 5.0 x 1 and Embedded Linux x 2.

1. Windows CE 5.0 ARMV4I support has been verified for MOXA's UC-7408 and UC-7420.
2. Embedded Linux is only supported for MOXA's UC-7100 line.

Intuitive and Easy-to-Use Function Calls

The MXIO library is straightforward and easy to understand. Take a look at the following illustration to see just how easy it is. (MXIO library 1.0.0.1 only)

1. System Conmmands

RS-485/RS-232 I/O Connect Commands
MXSIO_OpenCommPort
MXSIO_CloseCommport
MXSIO_Connect
MXSIO_Disconnect

Ethernet I/O Connect Commands
MXEIO_Init
MXEIO_Exit
MXEIO_Connect
MXEIO_Disconnect
MXEIO_CheckConnection

General Commands
MXIO_GetDLLVersion
MXIO_GetModuleType

2. Modbus Command Sets
MXIO_ReadCoils
MXIO_WriteCoils
MXIO_ReadRegs
MXIO_WriteRegs

3. Direct I/O Command Sets

Digital Input Commands
DI_Reads
DI_Read

Digital Output Commands
DO_Reads
DO_Read
DO_Writes
DO_Write

Analog Input Commands
AI_Reads
AI_Read

Analog Output Commands
AO_Reads
AO_Read
AO_Writes
AO_Write

RTD Commands
RTD_Reads
RTD_Read

Thermocouple Commands
TC_Reads
TC_Read

Special Commands for ioLogik 4000
Adp4K_ReadFirmwareRevision
Adp4K_ReadFirmwareDate
Adp4K_ReadSlotAmount
Adp4K_ReadStatus
Adp4K_ReadAlarmedSlot

Easy Addressing Using Slot Number + Channel Number

```
//read specific channel's temperature value
iRet = RTD_Read( iHandle,    //the handle for a connection
       5,    //slot position
       1,    //channel number
       dValue  //read specific Temperature value in °C
       );
```

Traditionally, programmers had to include a calculation for the Modbus address in their program. Now they only need to point out which slot and channel they want to access. Working in this way is easier and more intuitive.